Defying the odds? Identifying and understanding the relationship between health and resilience

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Joanne-Marie Cairns-Nagi

Research on ‘health resilience’ at the area-level is still in its infancy. Only a few studies to date have identified areas in England that have exceeded, or overachieved, in health outcomes despite significant long-term economic deprivation (otherwise known as ‘defying the odds’). Such findings have previously been conceptualised in terms of ‘health resilience’. This research is the first to explore area-level ‘health resilience’ (captured by morbidity and mortality) at different geographic scales using a mixed-methods approach. Regression Tree Classification (RTC) was used to identify local areas (Local Authority Districts, Census Area Statistical Wards and Lower Super Output Areas) that performed relatively well in terms of mortality (premature mortality 1998-2003) and/or morbidity (self-reported not good general health and limiting long-term illness from the 2001 Census) despite experiencing long-term economic deprivation (Townsend scores 1971-2001).

The RTC statistical analysis results show that there is considerable variability in the identification of ‘health resilience’ in terms of both scale and health outcome considered. Potential mechanisms underpinning this ‘health resilience’ were explored using focus groups and in-depth interviews in one ‘health resilient’ case study area in North East England. Case study findings suggested that place attachment, social capital, and the natural environment may have played a role in militating against the detrimental health effects of long-term economic deprivation. Factor Analysis, Multiple Correspondence Analysis and Logistic Regression examined these factors further in order to see if they had wider transferability; however, the results indicated mixed findings. The study concludes by exploring the implications of these findings within the context of both public health policy and by outlining future avenues for research.

Keywords: Health resilience; Mixed-methods; Mortality; Morbidity; England; North East England.

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List of Abbreviations

ART	Attention Restoration Theory
CASWARD	Census Area Statistical Ward
DEATHS	Premature Deaths (below the age of 75)
DEFRA	Department for Environment, Food and Rural Affairs
DH	Department of Health
FA	Factor Analysis
FANP	Find Adjacent Neighbouring Polygons
GCT	Geographically Converted Table
GLUD	Generalised Land Use Database
IDeA	Improvement and Development Agency
IMD	Index of Multiple Deprivation
LAD	Local Authority District
LLTI	Limiting Long-Term Illness (Self reported Census measure)
LR	Logistic Regression
LSOA	Lower Super Output Area
MAUP	Modifiable Area Unit Problem
NEE	North East England
NGH	Not good health (Self reported Census measure)
NICE	National Institute for Clinical Excellence
ONS	Office for National Statistics
PCT	Primary Care Trust
QOF	Quality Outcomes Framework
RTC	Regression Tree Classification
SPSS	Statistical Package for the Social Sciences
WHO	World Health Organisation

Declarations

The material contained in this thesis has not previously been submitted for a degree in this or any other institution. It is the sole work of the author.

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For my faithful family and friends

Chapter 1

Introduction

There is a well-established geographical literature that demonstrates the area-level relationship between economic deprivation and poor population health (Townsend *et al*., 1988a/b; Phillimore, 1990; Carstairs and Morris, 1991; Congdon *et al*., 1997; Shaw *et al*., 1999; Mitchell *et al*., 2000). Within this field of research, particular attention has been paid to outlying cases, most notably those areas that have worse health compared to other similarly deprived areas. The excess mortality found in Scotland, or more specifically, Glasgow (known as the so-called Glasgow effect), is an example of this (Sridharan *et al*., 2007; Shelton, 2009; Walsh *et al*., 2010; Popham and Boyle, 2011). More recently though, there has been an interest in those areas that exhibit better health outcomes than would be expected given their level of deprivation (Doran *et al*., 2006; Tunstall *et al*., 2007; Van Hooijdonk *et al.*, 2007; Mitchell *et al.*, 2010; Cairns *et al.*, 2012). This 'defying the odds' has been conceptualised in the literature as 'health resilience': the capability of communities 'to cope successfully [in terms of health] in the face of significant adversity or risk' (Tunstall *et al*., 2007, p.337).

This thesis is made up of three main arguments. Firstly, this thesis argues that it *is* possible to weaken the typically strong relationship between area-level deprivation and poor population health, with some areas having been found to

have ‘defied the odds’ and having gone on to achieve relatively positive health outcomes (measured by both morbidity and mortality). Such an argument is consistent with views expressed by Macintyre (2007) and Fagg (2010) who argue that poorer areas do not necessarily always lack health-promoting resources.

Secondly, it is argued that while ‘health resilience’ has been identified in the analysis, there is much variability in ‘health resilience’ in terms of both scale and health outcome considered, so it is important that researchers interested in applying this notion of ‘health resilience’ at an area-level are aware of the need to think critically about these issues.

Thirdly, resilience and risk are not polar opposites; rather, they should be considered as a continuum. While some of the protective factors were identified as contributing towards the finding of ‘health resilience’, they could also be risk factors, for instance social capital. Moreover, this research identified risk factors that may present challenges for the sustainability of ‘health resilience’ in the future.

This introduction starts by exploring the concept of ‘resilience’, including where it is derived from, how it has been conceptualised and applied in health research, and more recent developments in health geography that have found places to be resilient in addition to people. The chapter then proceeds to discuss the research context, the rationale for the research and the contributions the thesis seeks to make both in terms of knowledge and policy, the research aims and questions, key concepts, the methodological approach adopted in this research, and finally the thesis structure.

Genealogy of resilience

Although this thesis is mostly interested in resilience from a health perspective, it is imperative to trace from where this concept has been derived and how its context has influenced understandings and conceptualisations of this term more broadly, before focusing specifically on the application of the concept of resilience for health.

Common phrases used to describe resilience refer to something, or someone, being able to 'bounce back'. The term is derived from the Latin word *resalire*, which literally translates as 'to leap back' (Gunderson, 2010). The concept of resilience emerged in ecological studies during the early 1970s. Most notably, Holling's work on resilient ecosystems under the new 'complexity science' (Holling, 1973) was one of the first to apply this concept to ecosystems. Holling went on to found the Resilience Alliance[1] (Walker and Cooper, 2011) and some of the early initiatives have been incorporated into the Stockholm Resilience Centre[2], which is a world-leading, high-profile think tank dedicated to using resilience theory in socio-ecological research. Ecological literature defines resilience in two ways: (1) the ability of an ecosystem to return to an equilibrium (also termed 'engineering resilience' by Holling); and (2) the capacity of an ecosystem to tolerate disturbance whilst still retaining its function/state (or 'ecological resilience' as described by Holling). These two definitions suggest that resilience is either an outcome (a system returning to original state) or a process (being able to adapt).

[1] The Resilience Alliance was founded in 1999. It is a research organisation comprising researchers who explore the dynamics of socio-ecological systems.
[2] Stockholm Resilience Centre was established in 2007. The Centre is committed to developing a trans-disciplinary research environment. It in run by collaborative partners: Stockholm University, the Stockholm Environment Institute, and the Beijer International Institute of Ecological Economics.

What is 'health resilience'?

Adopting a resilience approach offers health researchers a positive, salutogenic[3] way of conceptualising health. Instead of focusing on what contributes to poor health, this approach concentrates on factors that enable people or places to overcome the detrimental effects of poverty. In terms of policy, the prospect of weakening the typically strong ecological relationship between area-level deprivation and poor population health through mechanisms or resources which militate against poor health outcomes can be seen to be attractive. As such, an asset-building approach geared at promoting health and fostering 'health resilience' in economically deprived areas may benefit from being implemented in public health policy initiatives.

Mitchell and colleagues (2006) discuss how health research typically focuses on illness rather than positive health and well-being. Whilst the general pattern of explanation is that adverse circumstances lead to worse health, they assert that:

> …some people and places [which] seem to get by, cope, or even thrive, despite the adversity they experience… (p.1)

This has led public health researchers to ask questions about what types of lessons can be learned from these examples of individuals or places. This type of thinking is in keeping with the current public health agenda that surrounds us with the formation of new Public Health England and the various bodies being implemented to improve health, focusing on wellness as opposed to ill-health.

[3] Derived from the term 'Salutogenesis'. It is a concept coined by Aaron Antonovsky in 1979.

Originally, health research that has applied this concept of resilience has concentrated on individual capabilities to overcome the odds. The vast majority of work has focused on children who have been able to rise above adverse conditions with studies on positive development of children living with parents suffering from mental health disorders (Garmezy and Rutter, 1983; Werner and Smith, 1988), positive educational outcomes (Garmezy, 1991; Cassen *et al*., 2008; Obradović *et al*., 2009), and positive adaptation from childhood to adolescence (Masten *et al*., 1999). Resiliency theory endorses the argument that resilience is a personality trait; however, it is increasingly being used to describe families and whole communities and populations.

Conceptualisations of resilience vary widely (Luthar *et al.,* 2000) and this has raised serious questions about the usefulness of the concept. The following definition outlines an oft-cited definition of resilience.

> Resilience refers to a **dynamic process** encompassing positive adaptation within the context of significant adversity. Implicit within this notion are two critical conditions: (1) exposure to **significant threat or severe adversity**; and (2) the achievement of **positive adaptation** despite major assaults on developmental processes.
>
> (Luthar *et al*., 2000, p.1. [Own emphasis added])

As stated in the above, a vital component of resilience is some form of adversity. Adversity is perceived as a risk (at odds with positive outcomes) and has been argued to include genetic, biological, psychological, and socio-economic factors that are associated with the increased risk of negative outcomes and maladaptation.

Although resilience research has burgeoned in the past few decades there have also been growing concerns over the concept. Critics have commented on the ambiguities that exist in defining resilience, the heterogeneity of risks, and more generally the usefulness of the construct (Luthar *et al*., 2000). A recent *Narratives of Resilience* workshop that I was involved in similarly highlighted the variability in how resilience is both constructed and applied in different contexts, more than a decade after Luthar and colleagues were writing[4].

Resilience now seems to be one of those increasingly used terms that is almost devoid of all meaning and has rippled through many different disciplines and subsequently been conceptualised and operationalised in many different contexts. Whether or not this is a problem is debatable. However, it is argued here that resilience is a term that is in fact locally situated and that context is a domain through which we understand resilient processes and outcomes. Therefore, based on this argument it is not an issue that resilience has been taken to mean different things in different contexts. What seems to me to be more of a problem is the lack of conceptual clarity and the uncritical usage of the term.

In spite of the heterogeneity surrounding resilience definitions, there is mostly agreement that resilience is apparent only when there is exposure to significant adversity or risk(s). However, the plurality of meaning in evaluating risk and adversity has also been critiqued. The notion of risk in resilience research has previously stemmed from epidemiological work, identifying expected probabilities of maladjustment (Schoon, 2006). Risk can vary from children

[4] *Narratives of Resilience* – workshop borne out of postgraduates in our Geography department at Durham University.

residing in disadvantaged family circumstances to enduring stressful experiences or trauma. The plurality of risk associated with resilience therefore becomes apparent and this may be problematic when trying to measure so-called resilience. Moreover, variability in risk exposure is also criticised. For instance, it is difficult to establish whether all individuals identified as resilient have undergone comparable levels of adversity (Luthar *et al*., 2000) and whether or not this is significant.

Furthermore, studies on resilience have often focused on a single risk factor. However, it has been argued that risk factors do not exert their effects in isolation but in interaction with other influences (Schoon, 2006). A whole complex systems approach is perhaps important in trying to identify and unpack risk factors and the inter-connections to other risk factors within the system under consideration. Serious life-damaging risk is argued to emanate from the accumulation of disadvantage. It has also been recognised that persistent risk or adversity have stronger effects on individual outcomes than intermittent adversity (Schoon and Bynner, 2003; Schoon, 2006). Rutter and Madge (1976) discuss cycles of disadvantage and inter-generational disadvantage as having persistent effects on individual outcomes through the accumulation of risk factors from childhood to adulthood and potentially continuing into the next generation. Therefore, persistent risk and disadvantage increase the chances of negative outcomes in many domains of life and make it harder for those affected to succeed and have positive outcomes in factors such as health, relationships, and work.

Generally studies have found that individuals who experience persistent socio-economic disadvantage have fewer positive outcomes over their life course. Nevertheless, Bartley's (2006) research identified individuals who have been able to break this cycle and succeed to go on to have healthy and rewarding lives. Thus, this raises questions over possible protective or buffering factors that may have a role to play in helping these individuals to defy the odds.

Research context

There has been little research to date on 'health resilience' at the area-level with the majority of studies investigating this concept at the individual-level, as already explored. Only a few studies to date have identified areas of long-term economic deprivation that have exceeded, or overachieved, in health outcomes. As already mentioned, there is a great deal of geographical literature supporting the strong ecological association between deprivation and poor population health. For instance, Townsend *et al*. (1988a) conducted research on the relationship between deprivation and population health in North East England and found that there was a strong association between deprivation and poor overall health at ward level (the Overall Health Index they used consisted of premature mortality, permanent sickness and disability, and low birth weight). Research by Carstairs and Morris (1991) has also shown there to be a significant association between mortality and deprivation at the small area-level in Scotland, with higher mortality concentrated in the poorest areas. Likewise, Congdon *et al*. (1997) showed that for English wards, mortality and self-reported long-term illness were associated with measures of area deprivation. Furthermore, Shaw *et al*.'s (1999) research, which examined parliamentary constituencies, found that both mortality and morbidity are highest in localities

which have high rates of poverty, unemployment and other manifestations of social and economic deprivation. Therefore, the typically strong ecological relationship between deprivation and poor health is well-documented.

Despite there being a great deal of evidence of the typically strong relationship between area-level deprivation and poor population health, there have also been some findings that suggest that the ecological association between deprivation and poor health is more complex than it seems. For instance, although Townsend *et al*. (1988a) found a significant association between deprivation and health, they also identified some areas in the North of England where this association was weakened, including some wards within Sunderland and South Tyneside local authorities. As such, these wards may be perceived as outliers in the typical ecological relationship between deprivation and poor health. It is interesting to consider that even though both Sunderland and South Tyneside have several of their wards among the most deprived, they still had considerably good overall health in comparison to other local authorities which contained some of the most deprived wards.

Furthermore, there are a couple of more recent studies in Britain which have identified some areas that do not follow this general trend and so they further weaken this ecological association between deprivation and health. One such study was conducted by Doran and colleagues (2006). They examined both deprived and affluent English local authorities and, as would be expected, life expectancy was strongly associated with material deprivation; interestingly however, some local authorities defied their economic contexts and overachieved in life expectancy whilst others (including some affluent local authorities) underachieved. Among the local authorities that overachieved there

were a couple of local authorities from the North East of England region including Berwick-upon-Tweed and Alnwick. These authors conceptualised 'health resilience' at the population level as 'deprived communities resisting the detrimental health effects of adverse socioeconomic conditions' (2006, p. 686).

Another study by Tunstall and colleagues (2007) also problematises the relationship between area deprivation and poor population health. Their research was longitudinal and they examined mortality (1981-2001) in persistently economically deprived parliamentary constituencies throughout Britain. Again, two of the parliamentary constituencies that were identified as resilient in terms of health were based in the North East of England: South Shields and Sunderland North. Thus, there appears to be something happening in some deprived areas, particularly in parts of Sunderland and South Tyneside, in the North East of England that buffers against poor health outcomes despite significant economic deprivation.

However, there is still a significant knowledge gap in understanding why some deprived areas do relatively better in health than others. This knowledge gap affects both research and policy concerning the characteristics of what makes one area 'health resilient' whilst another, similarly deprived, area is not. This research seeks to address this gap. The follow-up study to Tunstall *et al.* (2007) that sought to try to explain *health resilience* found that community cohesion (founded by a common industrial heritage) and supportive social networks were among the strongest findings to emerge from the various case studies (Mitchell *et al*., 2009).

In addition, in 2008/2009 a pilot study was conducted for this doctoral research which extended Tunstall *et al*.'s research mentioned above (Cairns *et al*., 2012). The results of this pilot study revealed that there may be different mechanisms operating in economically deprived areas that may provide protective factors in terms of negotiating against poor health outcomes. This research focused on the same deprived English parliamentary constituencies and expanded the operationalisation of 'health resilience' to include morbidity as well as mortality. This multi-dimensional operationalisation was adopted in order to investigate whether or not the parliamentary constituencies that were identified by Tunstall and colleagues were still found to be resilient when other health outcomes (morbidity) were considered. The research identified four parliamentary constituencies that consistently exhibited better health (morbidity and mortality) despite long-term material deprivation. One of these areas was located in North East England: South Shields. In terms of understanding this 'health resilience', *a priori* hypotheses about ethnicity, migration, employment type, housing tenure and social capital were tested. The modelling suggested that social housing, ethnicity, employment type and civic engagement – a measure of social capital (measured by abstention from voting) - were all significantly associated with the morbidity score. However, the resilient parliamentary constituencies were extremely diverse. Whilst ethnicity, for instance, may have been an influential factor in determining morbidity outcomes in the London or Birmingham resilient constituencies (locations with diverse ethnic compositions), this argument may be limited when applying it to South Shields (an area that is less dense in ethnic minority groups). Social capital (measured by abstention from voting and social fragmentation) and employment type, however, may be something that the

resilient areas share in common and so is worthy of further examination, particularly in North East England where communities may be socially cohesive and share common heritage in relation to former coalfield industries.

These studies have pointed to several important factors which may help to militate against the negative deprivation effects and help to explain instances of 'health resilience'; however there is a need to further explore possible protective factors operating in deprived areas that make them 'health resilient'. Particularly lacking is a focus on contextual characteristics of areas (social and physical) that may be advantageous to deprived neighbourhoods such as access to green spaces, social capital, community centres and health services, amongst others. Moreover, Doran *et al.* (2006) suggested that policies and activities of local authorities may well provide some explanation to overachievement or underachievement in terms of health since they influence the delivery of community services, such as schooling, recreation centres, libraries, housing and so forth.

Rationale for research: originality and contribution to knowledge

Some of the aforementioned studies are arguably limited as they have examined single indicators of health, either life expectancy or mortality, which give an incomplete picture of health based solely on longevity and masks other significant factors such as quality of life. Thus, they do not consider the multi-dimensional nature of (ill)health. I therefore argue that there is a need to develop operationalisations of 'health resilience' further in order to identify economically deprived areas that are overachieving in a range of health outcomes, which would not only strengthen findings of 'health resilience' but would encompass the various dimensions of health and ill-health that are often

overlooked in health research due to constraints in the availability of secondary data.

In addition, the limited number of studies on 'health resilience' in Britain has yet to examine small areas which would enable the identification of 'health resilience' within larger geographical units (such as wards within local authorities or parliamentary constituencies). Such an approach would be beneficial for highlighting small area variations in health outcomes within larger geographies for a more nuanced understanding of what is happening beneath the surface.

As far back as the 1980s, Townsend and colleagues made a valid point for justifying their use of small areas in their study of deprivation and health: 'when data are aggregated for larger areas, a lot of the telling evidence can become blurred' (1988, p.78). This still applies to contemporary research and as a result this thesis seeks to establish an approach that is able to identify health and deprivation variations at the small area-level.

Research aims and questions

The aims of this doctoral research are twofold. Firstly, it seeks to identify deprived areas (at different geographic scales) in England that exhibit better health outcomes than would be expected given significant economic adversity. Secondly, once these areas have been identified, the thesis aims to ascertain plausible explanations for these 'unexpected' health outcomes that may account for findings of 'health resilience'.

The research questions that will be examined in this thesis will address the gaps identified in area-level 'health resilience' literature that have already been

discussed. These include: (1) uncritical and uni-dimensional operationalisations of 'health resilience' that solely focus on longevity or survival and not quality of life; (2) analysis limited to large-scale geographies (either parliamentary constituencies or local authorities); and (3), perhaps most significantly, only limited explanations of 'health resilience' explored to date. Therefore, the research questions addressed in this thesis are as follows:

(1) Which areas in England can be identified as exhibiting 'health resilience' (based on morbidity and mortality) at different geographic scales?
(2) Are there any protective mechanisms or resources operating in these 'health resilient' areas? If so, can these protective factors be translated into public health policy in order to help other deprived areas have better population health?
(3) Are there any potential barriers or risk factors that could prevent economically deprived areas from going on to achieve better health?

Key Concepts

So far I have talked unproblematically about terms that are central to this research. In the following, I therefore attempt to unpack what is meant by the two key terms: 'economic deprivation' and 'health resilience'.

'Economic deprivation'

Deprivation manifests itself in many ways. There are different types of area deprivation including economic, social and environmental. Many indices are used to define economic deprivation including low income, unemployment, low levels of education, etc. In this thesis, area-level economic deprivation is defined as lower economic capital and is measured by the Townsend Index of

Deprivation (Townsend *et al*., 1988a). This index uses unemployment, private renting, no car ownership, and overcrowding census variables to define material deprivation. Of particular interest is long-term and persistent as opposed to intermittent area-level economic deprivation. In this thesis I examine longstanding deprivation over four decades: 1971, 1981, 1991 and 2001.

I have chosen to focus on economic deprivation as opposed to social deprivation (which can be defined as areas lacking in social amenities –poor access to recreational facilities, poor schooling, parks, etc) for two reasons. Firstly, there is a more established area-level association between economic deprivation and health than social deprivation and health: the higher the material deprivation the poorer the health, and vice versa. The second reason for focussing on economic deprivation is conceptual. It is possible that levels of social deprivation may compensate for, or militate against, the negative and detrimental effects of economic deprivation. This is something that is expanded on in ***Chapter 2*** when I discuss four different forms of capital (economic, social, natural and human).

'Health resilience'

As already explored, resilience is something of a 'buzz word', the meaning of which is often opaque. It is imbued with different meanings depending on context and discipline, which makes the concept challenging to pin down. It has been described as both a process and an outcome. It has also been viewed as an individual trait as well as something to do with wider contextual or collective factors. In health geography the concept has yet to flourish with only a handful of studies that have attempted to examine this concept at the area-level. In this thesis I conceptualise 'health resilience' as both a process and an outcome. It is

a process in the sense that it develops over time and the protective mechanisms also operate over time (not instantly). It can also be classified as an outcome as it results in positive outcomes (e.g. better than expected health measured by lower morbidity and mortality). I argue that it can be found at both the individual *and* area-level. However, this thesis is particularly interested in the area-level. Finally, factors that influence 'health resilience' can be at the micro (individual), meso (family/community level) and macro (population) levels. This thesis focuses on the meso and macro levels in this research, but it still recognises the importance of the micro, although it is not directly measured in this research.

Methodological approach

A mixed-methods approach is adopted in this research. Statistical data analysis is used to identify 'health resilient' areas throughout England. This is accompanied by an in-depth qualitative case study of one 'health resilient' area that significantly overachieved in two health outcomes (limiting long-term illness and premature deaths) thus both morbidity and mortality. Additional statistical analysis is also conducted to further explore mechanisms of area-level 'health resilience' in order to find out whether or not the identified protective factors operating in the case study area may hold wider transferability. Indeed, it may be that in this thesis the identified 'health resilient' areas do not share the same protective mechanisms or resources, but there may also be some that do share similar profiles and protective factors that could operate to protect other similarly deprived contexts.

The decision to use a mixed-methods research design is partly due to the limitations of secondary data analysis for identifying underlying mechanisms of

'health resilience'. Firstly, there is the issue of the availability of data on area characteristics. Secondly, testing a priori hypotheses does not allow for explanations to be identified that are not anticipated and as such this denies the possibility of ascertaining other protective factors that may be integral to understanding 'health resilience'. Consequently, conducting an in-depth case study of a 'health resilient' area will be beneficial in further unpacking underlying factors that positively influence health that may not be captured with quantitative analysis alone. This thesis makes a strong call for the utility of conducting mixed-methods research, which is further discussed in ***Chapter 3***.

Thesis structure

This thesis starts by reviewing the academic literature in ***Chapter 2*** on relevant conceptual and theoretical frameworks that may provide an understanding of 'health resilience'. This chapter starts by considering the various theoretical models of health inequalities. The psycho-social model is emphasised in this thesis as it is the most useful in trying to explain some of the research findings. It then goes onto discuss the social determinants of health and 'four capitals' model. Social capital is significant to understanding the research findings and is central to this thesis. Social capital has traditionally been viewed as positive and protective for health. Whilst there are traces of this in this research, it is argued that there is a third dimension that could potentially result in segregation of communities, which may have negative implications for population health.

The relative importance of contextual, compositional and collective explanations is then discussed. It is argued that these three explanations for understanding place effects on health are not mutually exclusive and that they all have a part

to play. Similarly the false dualism of structure/agency is then critically discussed.

This is followed by a discussion of an important development in social science, complexity theory. It is argued that this theory is useful for theorising about the production of 'health resilience' and the factors underlying it. Path dependency, relationality and interactivity are three key processes that make complexity theory useful in this research.

The notion of therapeutic landscapes, biophilia, topophilia and attention restoration theory are also found to be useful in understanding the role of the natural environment for 'health resilience'.

Lastly, place biography, place attachment and place identity are discussed. The importance of the past in forming place attachments and a shared identity are found to be important in this thesis. Therefore, the ideas put forward by literature on place biographies, place attachment and place identity are able to frame these findings and their importance for health and well-being. These various theoretical and conceptual ideas that have been outlined provide the backdrop to making sense of the research findings.

Chapter 3 outlines the methodological approach deployed in this doctoral research and challenges the assumption that mixed-methods are epistemologically incompatible. Rather, it is argued that mixed-methods provide a complementary and pragmatic approach to the examination of 'health resilience'. The barriers of bridging the two supposedly epistemologically conflicting research paradigms are considered alongside the potential uses of combining them. The various research methods that were deployed are then

presented. These include different statistical analysis techniques (including Regression Tree Classification, Bayesian Spatial Smoothing, Factor Analysis, Multiple Correspondence Analysis and Logistic Regression), focus groups, interviews, informal conversations and observation. Finally, I reflect on my own positionality, issues of power in the research process, and ethical considerations surrounding the research.

Chapter 4 discusses the first set of empirical findings from the Regression Tree Classification statistical analysis. It identifies 'health resilient' areas in England at different spatial scales (at the national and local level). The underlying argument of this chapter is that health inequalities do not just manifest themselves *between* regions, but that inequalities also exist *within* regions, and as such it is pertinent that we consider better ways of identifying these differential outcomes and spatially varied experience of health and deprivation by examining different geographies.

Chapter 5 presents empirical findings from the in-depth qualitative case study and explores possible protective resources underlying 'health resilience'. This chapter comprises five sections. In section one the notion of place biographies is used to frame findings of how the past is crucial to understanding the formation of strong, tight-knit communities. This collectively shared history (founded on common industrial heritage) has significantly shaped community relations. Section two discusses findings relating to social capital. Bonding and bridging forms of social capital are used to situate empirical findings. It is also argued that a third dimension of social capital may be present within the case study area, which is referred to as the 'divisive'. The third section explores the role of the local natural environment in positively shaping population health in

the case study. It draws on therapeutic landscapes, biophilia, topophilia and attention restoration theory. Fourthly, rurality and the positive effect it may have on population health is explored. The final section presents further statistical analyses (Factor Analysis, Multiple Correspondence Analysis and Logistic Regression) to test the transferability of the above findings in other 'health resilient' areas.

Chapter 6 presents further case study findings that may be perceived as risks to achieving and sustaining 'health resilience'. Several aspects of the locality emerged as potentially threatening for 'health resilience' in the research, including poor public services and amenities (particularly poor public transport, availability of local affordable supermarkets, the quality of healthcare, lack of leisure and recreational facilities), lack of employment opportunities, migration and housing regeneration-associated issues. Residents feeling *"off the map"* and the *"forgotten about people"* within Castle Morpeth is significant. The underlying argument of this chapter is that resilience and risk go hand-in-hand and are on a continuum as opposed to dichotomies. These 'risky' factors may present issues for the future of 'health resilience', making it unsustainable.

Chapter 7 reflects upon the implications of the research findings by considering public health policy recommendations. It is recognised that while some of the findings may be straightforward, other findings, including the importance of place attachment and social capital, are harder to implement into area-based initiatives to promote health and more specifically 'health resilience'. It also recognises that the findings from this case study may be more challenging and potentially unhelpful in other areas due to the diverse contextual settings.

Nonetheless, we can definitely learn some lessons from this case study about what has worked well and positively influenced population health.

Chapter 8 synthesises all of the research findings and indicates how these relate to the initial research aims and questions; it critically discusses the strengths and limitations of the research; it considers the contributions this research has made to health geography and public health policy; and, finally it identifies avenues for future research.

Chapter 2

Review of the academic literature

As already discussed in ***Chapter 1***, many studies have demonstrated that there is a strong association between area-level deprivation and poor population health outcomes resulting in geographical inequalities in health. This chapter reviews the health inequalities and social determinants of health literature as well as exploring conceptual and theoretical frameworks for understanding the relationship between health and place. It examines how health inequalities are produced and reproduced through contextual, compositional and collective explanations. Furthermore, it considers resources that may help to militate against economic deprivation, protecting deprived areas from experiencing poor health outcomes which may result in 'health resilience'.

Models of health inequalities

The publication of the *Black Report* in 1980 was a significant milestone for health inequalities research. It recognised that while the nation's health had improved overall there were widespread and growing socio-economic inequalities in health.

The Black Report indicated that inequalities in health were large in Britain despite a welfare state and nationalised health service (Townsend *et al*., 1988). Twenty-eight years later a report by the Department of Health indicated that health inequalities are still widespread and that whilst general population health

has improved, health inequalities persist and have widened for the most disadvantaged groups (Department of Health, 2008). The Black Report put forward three explanations for inequalities in health: materialist/structuralist, cultural-behavioural and selection models (Davey Smith *et al*., 1990; Blane *et al*., 1993).

The materialist model postulates that health inequalities are the result of socio-economic and socio-structural factors in society. Macintyre (1997) distinguishes between 'hard' and 'soft' material and structural determinants. The 'hard' version relates to physical aspects of the environment (such as environmental hazards), whereas the 'soft' relates to the social and economic factors (such as education). The contribution that the environment and places have to play in health inequalities may be more obvious now when these models are broken down.

In contrast to the material-structuralist model, the cultural-behavioural model argues that health-damaging or health-promoting behaviour is influenced by personal characteristics and circumstances, cultural traditions and values, and social norms, can explain health inequalities. West (1998) sub-divides the selection model into two bodies of thought: the natural and the social. The natural selection model posits that health is caused by, and is not a consequence of, social class. Worryingly, this model shares a Social Darwinist perspective whereby the 'fittest' are selected into higher social classes and the 'weakest' occupy the lower social positions in society. The social selection model recognises that health status can have consequences for social life and as such it is argued that there is 'direct' (health is related to social mobility e.g.

chronic illness might affect job opportunities) and 'indirect' (socio-economic circumstances affect health) health selection.

Since this report there have also been other significant theoretical developments that seek to explain health inequalities. These include the neo-material, psycho-social, and life course models (Bartley, 2004). In addition, the 'artefact' explanation has been discussed more recently in relation to health inequalities. These models and their contributions to understanding health inequalities are summarised in Table 2.1.

Elstad (1998) challenges materialist explanations and argues that the psycho-social perspective is core in explaining variations in health outcomes. According to this perspective, psychological stress, caused for instance by lack of social support, can be detrimental to health. On the other hand, feelings of mastery, self-efficacy, and being in control can be health-promoting and act as a buffer against adversity. This was identified in Bartley's (2006) research which suggested that social capital (social relationships and community ties) may be sources of protection. The psycho-social perspective is pivotal to understanding some of the research findings in this thesis and will be drawn upon throughout.

Table 2.1: Summary of theoretical explanations for health inequalities

Model	**Explanation**
Artefact	This questions whether or not health inequalities actually exist. It considers them to be an artefact of data collection and measurement.
Materialist/Structuralist	Socio-economic and socio-structural factors in the distribution of health.
Neo-Materialist	Differences between societies in social policies and institutions and their impact on health e.g. welfare systems

	between countries. Within countries, this explanation concentrates on differences in public provision (e.g. schools).
Cultural-Behavioural	Behaviour that is health-damaging or health-promoting which may be the result of personal characteristics, education, cultural beliefs or social norms.
Selection	'Survival of the fittest' Darwinist explanation: the relationship between social class and health (high social class leads to greater social mobility and better health and vice versa).
Psycho-Social	Psycho-social effects of circumstances at work, home, of social status, etc.
Life Course	Developed in the 1990s as a result of longitudinal studies. Health in adulthood may be influenced by complex circumstances over time and the accumulation of disadvantage over the life course.

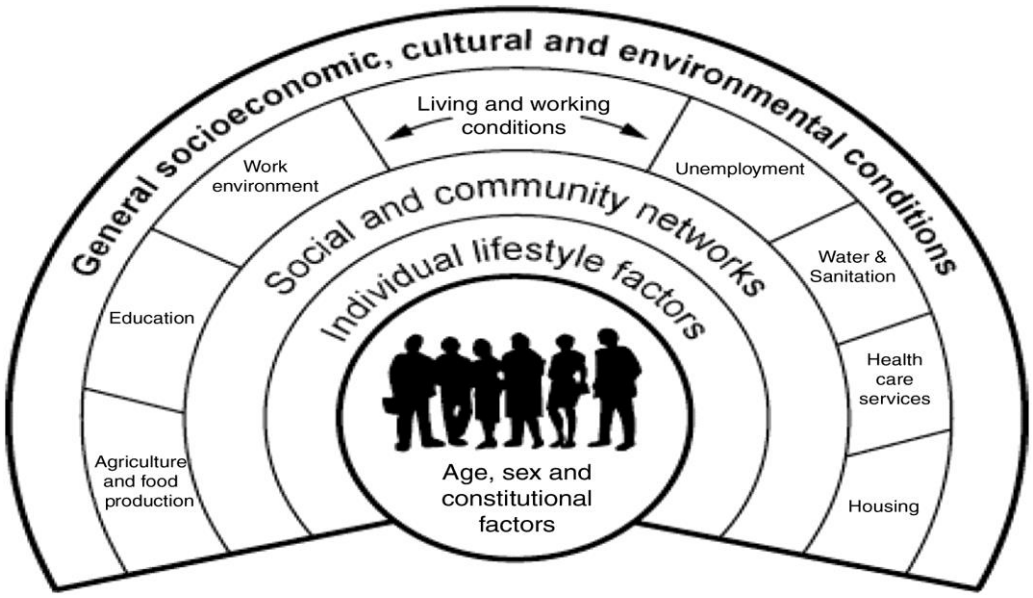
Conceptual frameworks: unpacking the social determinants of health

Over the past decade there has been a growing body of literature dedicated to the examination of the social determinants of health (Wilkinson and Marmot, 2003; Raphael, 2004; Marmot and Wilkinson, 2006). Despite contemporary work on social determinants of health, the term 'social determinants' actually dates back to the 1970s (Wilde, 2007). The term arose out of a concern that most attention was paid to the delivery of health care in improving population health, often overlooking the impact of social circumstances and preventive services. Since then, public health research has been increasingly interested in examining the role of the wider social environment in relation to population health and more recently salutogenic and asset-based approaches.

Dahlgren and Whitehead's (1991) 'rainbow of health' model is oft-quoted in discussions on the social determinants of health (Figure 2.1). This conceptual

model draws on various individual, social, economic, cultural and environmental conditions, all of which are thought to impact upon population health. This model makes an ontological argument about health and how it is constituted. It is made up of individual, social, cultural, economic and environmental conditions. This model is misleading by separating out the different layers, which overlooks the interactions between these levels; however, it is useful for unpacking the wider socio-economic and environmental influences on health.

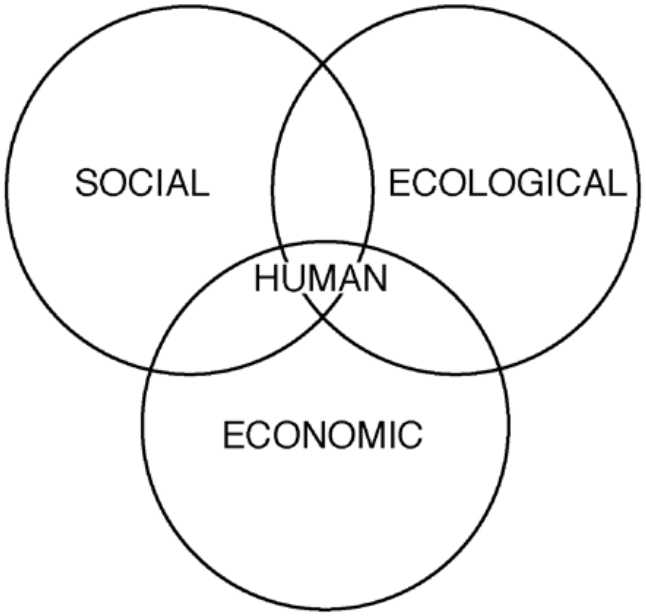
Figure 2.1: Dalgren and Whitehead's determinants of health model (1991, p.11)



A second conceptual framework for thinking about how health is differentially experienced is the four capitals model (Figure 2.2), developed by Hancock (2001). This model is often used in the field of health promotion, which conceives of human health from a health model as opposed to a disease model (again this notion of salutogenesis (Antonovsky, 1979) – origins of health - is at the core of this thinking). This multi-faceted model captures the complex interaction of human, natural (ecological), social and economic capital in areas

and how spatial variations in these forms of capital may impact on health outcomes. The model also has implications for policy in terms of bringing together three policy areas: social, environmental and economic.

Figure 2.2: Four capitals model (Hancock, 2001, p.277)



Human capital refers to individuals and consists of healthy, skilled, well-educated individuals who are engaged with their communities. Natural, or ecological, capital includes good natural resources, high environmental quality, and healthy ecosystems. Economic capital constitutes a high level of economic prosperity in an area. Lastly, social capital is the 'glue' that essentially holds communities together; strong social cohesiveness and civic engagement are core features of social capital.

The impact of social capital on health has received great interest among health researchers in recent years (Kawachi et al., 2007); however this is not a new phenomenon. On the contrary, earlier thinkers such as Pierre Bourdieu (1986) refer to this term. In addition, James Coleman (1990) and Robert Putnam

(1993; 2000) are key thinkers in this field. All three thinkers differ in their conceptualisations of social capital. Social capital generally includes civic engagement and participation; local civic identity - sense of belonging, solidarity and equality with the local community; reciprocity; a sense of obligation to help others; and trust in the community (Whitley and Prince, 2005; Kawachi *et al*., 1999).

More specifically, Bourdieu (1986, p.248) defines social capital as:

> …the aggregate of the actual or potential resources which are linked to possessions of a durable network of more or less institutionalized relationships of mutual acquaintance and recognition – or in other words to a membership of a group – which provides each of its members with the backing of the collectively-owned capital.

Coleman (1990, p.302) states that:

> Social capital is defined by its function. It is not a single entity, but a variety of different entities having two characteristics in common: They all consist of some aspect of social structure, and they facilitate certain actions of individuals who are within the structure.

Lastly, Putnam (1993, p.167) defines social capital as:

> …features of social organisation such as trust, norms, and networks that can improve the efficiency of society by facilitating coordinated actions.

The most striking difference in the above definitions of social capital is the level at which it is conceptualised: micro (individual) and macro (community or state). Bourdieu and Coleman talk about social capital at the individual level, whereas

Putnam argues that social capital can be applied to the area and societal (collective) levels as well as an individual asset. In addition, Putnam refers to two distinct forms of social capital: *bonding* and *bridging* (2000). Bonding social capital is about forming unity within homogeneous groups, whereas bridging is unity between heterogeneous groups.

It has been argued that social capital is linked to health and health inequalities: the greater the amount of social capital, the better the population health. Curtis (2010) discusses how 'normative' social capital is expected to improve population health through the encouragement of healthy behaviour and discouragement of unhealthy behaviours; by enhancing access to facilities and activities that promote health; enhancement of self-efficacy and self-esteem; and the reduction of anxiety and fear as a result of improved levels of trust in society. Furthermore, it has been posited that social capital is linked to health inequalities. For example, Wilkinson's inequality hypothesis argues that social inequality (not just income inequality) is an important determinant of health and health inequality and that social capital can be a mediator (Wilkinson 1996 and 1999).

This section has explored some of the social determinants of health and different forms of capital that will vary according to area of residence. This is significant since 'neighbourhoods essentially involve the availability of, and access to, health-relevant resources' (Bernard *et al*., 2007, p.1839). This links into the production of health inequalities as they arise from the unequal distribution of resources and services. This research will essentially be concerned with how resources are (unevenly) distributed among areas and

various forms of capital (social, economic and natural) that may impact positively or negatively on health.

Relative importance of compositional versus contextual explanations

Since the early 1990s there has been a growing interest in the role of place in influencing population health and as a result a debate has arisen over the relative importance of people or place characteristics (Macintyre *et al*., 2002). Gatrell (2002) argues that our health and our geographies are inextricably linked; yet how these are linked is greatly disputed. Attempts to understand geographical variations in health have fuelled great debate over the relative importance of compositional and contextual explanations. Compositional explanations draw on the characteristics of individuals to explain spatial variations in health, whereas contextual explanations attribute these variations to the characteristics of the environment. Many studies have stressed the importance of compositional characteristics over contextual ones (Sloggett and Joshi, 1998).

Despite trying to partition these explanations by viewing them as separate phenomena, several studies have found that there was still some residual effect of areas after having taken into account compositional features. For example, Macintyre (1999) observed this for mortality, limiting long-term illness, health-related behaviours and cardiovascular risk factors. Davey Smith *et al*.'s (1998) study in Scotland also found that area and individual socio-economic indicators both independently contributed to increased mortality risk. Similarly, Waitzman and Smith (1998) examined the effect of poverty in area of residence on mortality risks, and after controlling for individual characteristics, those living in

deprived areas showed a significant excess in mortality. What is perhaps more intriguing is the observation of interactions between area *and* individual characteristics.

Therefore, compositional and contextual explanations do not appear to be mutually exclusive but, rather, interacting factors. Macintyre *et al*. (2000) argue that people who 'partition compositional and contextual explanations ignore the possible interactions between these levels' (2000, p.339). Likewise, Frohlich *et al.* (2001) argue that 'a theoretical reconciliation of these two phenomena may provide a mechanism through which we can comprehend how the social gets under our skin' (2001, pp.782-783). Hence the distinction between composition and context is not a useful one and actually trying to separate the two has been argued to constitute an oversimplification (Bernard *et al*., 2007).

Furthermore, Macintyre *et al*. (1997) argue that there is a third explanation for geographical variations in health outcomes: the collective. Collective explanations emphasise the importance of socio-cultural and historical features of communities, placing significance on shared norms, traditions and values. Macintyre *et al.* (2002) further argue that collective explanations are not distinct from contextual ones. This third dimension is useful for theorising about social capital and social cohesion.

Structure versus agency

Just as compositional and contextual explanations for geographical variations in health outcomes have frequently been dichotomised, so too have structure and agency. The debate over structure and agency grounded in social theory has largely been discussed with reference to sociological work but it has received

attention by geographers within the 'new cultural geography' turn. The structuralist perspective 'assumes that there are underlying forces in society that create divisions' among populations (Gesler and Kearns, 2002, p.50). On the other hand, approaches that situate agency at the core of explaining variations in health outcomes are concerned with people's actions and experiences.

Giddens (1984) brings the two together in his structuration theory, which acknowledges the duality between structure and agency. Societal structures enable and constrain human actions whilst people also have the freedom to make choices within structures and may even change structures. This structuration theory has a lot to offer health inequalities research since there has been a reliance on viewing structure and agency as separate issues for too long. This dichotomy resonates in various theoretical models which seek to explain health inequalities, such as the materialist/structuralist versus the behavioural-cultural model, whereby the first model endorses the idea that structures are the main determinants of health inequalities whereas the latter model places emphasis on the individual's characteristics and behaviour as the main determinants of health variations. Therefore, there is a clear theoretical divide inherent in these frameworks with little attempt to link structure and agency together, which has been heavily criticised by medical sociologists (Frohlich *et al*., 2001; Popay *et al*., 2005; Bernard *et al*., 2007).

Popay and colleagues (2005) draw on Giddens and Bourdieu, both of whom argue for 'approaches to explanations in the social sphere that give due consideration to the combined effect of social structures and individual human agency' (p.370). Similarly, Frohlich *et al.* (2001) perceive structure and agency

as ‘recursive and co-dependent’ (2001, p.788). Lastly, Williams (2003) calls for a ‘deeper...understanding of the relationship between the individual and his or her social context’ (p.148).

The ‘black box’ of places

> ...there is a need to study directly those features of the local social and physical environments which might promote or inhibit health...
>
> (Macintyre *et al*., 2002, p.127)

This argument is well-tuned to the aims of this doctoral research since it seeks to establish which aspects of local social and physical environments promote health in spite of economic deprivation. Macintyre *et al.* (2002) developed an organising framework in order to demystify the ‘black box’ in explaining spatial variations in health outcomes. They put forward a conceptual framework with five features of local areas that might impact on health: (1) physical environment; (2) availability of healthy environments at home, work and play; (3) services provided; (4) socio-cultural features of a neighbourhood; and (5) reputation of an area.

These five hypotheses of place influences on health will now be examined in turn. The following are all plausible influences that may affect the health outcomes in the areas under study in this thesis and therefore it is vital to consider how these influences may help to explain why some deprived areas are resilient to the typical ecological relationship between area deprivation and poor population health.

Physical (Natural) environment

The physical environment ultimately includes aspects such as quality of air and water, natural aspects of the landscape such as water and green space, and so forth. These contextual properties may impact on health and illness either directly for instance by affecting the populations' respiratory functioning or indirectly perhaps by influencing health-damaging or health-promoting behaviours, such as (lack of) exercise. If there are plenty of green spaces, for instance, walking or running may be encouraged, and vice-versa.

Home, work and play

Wider socio-economic-political structures such as national and local policies will determine factors such as employment and the safeguards in place to ensure people are able to work in a safe, non-hazardous environment. The labour market will have a great impact on employment prospects which will vary according to area of residence. Quality and affordability of housing will be determined by local housing bodies. Also, the local council will play an important role in the availability of safe spaces for children and youth to play, by, for instance, maintaining parks and community centres.

Services

Likewise, wider structures influence the health care services in an area, as well as the quality of schooling, transport, street cleaning, amongst other factors. These structures could be implemented at the national or local level. The availability and affordability of healthy food in an area could also come under this section; this may be determined by the local food supply but the local food supply may actually be shaped by the demand for nutritious food in the area (an

instance of agency). Another instance where agency may play an important role in influencing health outcomes and behaviours may be choosing whether or not to use services available in an area, for instance services which help people to stop smoking. Supportive services such as these which encourage better population health may be limited in their effectiveness due to individuals' freedom to make choices.

Socio-cultural features

Socio-cultural features of an area may include social, economic, political, religious, ethnic and historical features of a community. These features may be collective, such as the degree of social capital, characterised by the levels of trust, crime, incivilities, civic engagement and community participation (Putnam, 2000), which is a feature of the social structure. Social capital is not to be confused with social networks and social support, which are attributes of the individual (Lochner *et al*., 1999). Compositional make-up may be cultural traditions and values characterised by the ethnic fabric that make up the area.

Reputation

Lastly, the reputation of a place as perceived by local residents, planners and providers, and investors may influence various factors, including the infrastructure of the area, the psychological well-being of residents who live there, and importantly who decides to move into and out of the area.

The interplay between context and composition is transparent in the above framework put forward by Macintyre *et al.* (2002). Social structures also play pertinent roles in explaining variations in health outcomes. Agency will likewise

play a significant role in varied health experiences, as individuals' actions and choices will influence health behaviours and experiences of a place.

In their study of diverse localities in Glasgow, Macintyre and colleagues (2000) discovered that many of the above features of local areas were positively related to health outcomes. However, often the opportunities to live healthily were poorer in more deprived areas. However, in this research it is thought that the economically deprived areas that exhibit better health outcomes than expected may have a better distribution of resources and opportunities, which may encourage more positive health outcomes and health-promoting behaviours than in other deprived areas. In order to understand geographical variations in health context, structure, agency and the compositional make-up of areas need to be studied not as separate properties but as interacting phenomena in a complex health system. This, I argue, will provide a better understanding of the complex relationship between area and health, and therefore the production of 'health resilience'.

Complexity and 'health resilience'

As already alluded to in this chapter, health systems are complex in nature. Complexity theory is an important development in the social sciences that recognises this complexity. Gatrell (2005) talks about a 'complexity turn' within the social sciences whereby he discusses the relevance of this theory for health geography. In this next section I explore complexity theory and its relevance to health geography in terms of understanding how health systems work, and ultimately how it may be useful for thinking about the emergence of 'health resilience'.

Complexity theory is not a unified body of theory as such (Thrift, 1999). Consequently, there is no set definition of what the theory is or what it entails. Some proponents of complexity theory have attempted to make broad-brush definitions of what underpins the theory. Byrne, for instance, states that it is an 'interdisciplinary understanding of reality as composed of complex open systems with emergent properties and transformational potential' (Byrne, 2005, p.97). Cilliers asserts that 'a complex system is not constituted merely by the sum of its components, but also by the intricate relationships between these components' (Cilliers, 1998, p.2). Blaikie also states that complexity theory 'rejects the epistemology of traditional science based on notions of universal knowledge, experimental control, determinism and a linear logic of causal explanation' (Blaikie, 2007, p.206). All of the above definitions contribute to an overall understanding of what complexity theory is.

Table 2.2: The main features of a complex system in relation to health

Characteristics of complex systems	**Example (health related)**
Large number of elements, interacting dynamically (via flows of material or information) across networks Interaction is rich and may involve both human and nonhuman agents (hybrids) or elements	A population in which people influence each others' health related behaviour, or transmit infections among each other People interact with other agents and organisations (healthcare providers; health-promoting and health-denying activities and facilities)
Interactions may be short range but the richness of interactions or relations across networks means that 'influence' can be wide ranging	'Friction of distance' implies interactions tend to be local, but time-space compression means that interactions having health consequences can be 'at a distance'
Each element is 'ignorant' of the behaviour of the system as a whole; therefore, we cannot understand the system by 'summing' or 'averaging' the behaviour of individual components; system-wide properties emerge	One is generally ignorant of the possible system-wide consequences of one's health-related behaviour; the 'public health' is more than the sum of individual disease profiles
Interactions are non-linear (which also implies that small causes have large results). There are feedback loops, of varying kinds	Disease outbreaks that are highly localised can spawn epidemics or even pandemics
Complex systems are open systems, interacting with environment	The health system is only closed at a global level, and even then it is open if we consider global environmental change
Complex systems are far from equilibrium	Population growth and movement ensures that the system is never fully stable
Complex systems have a history; their past is 'co-responsible' for their present behaviour	Migration, history of inequalities

Source: Gatrell (2005) p.2662

Gatrell (2005) characterises some of the main properties of a 'complex system'[5] outlined in Table 2.2. He makes explicit links between these properties and how they may be directly related to health trajectories. Table 2.2 displays several of the main components of complex systems. The first significant feature of complex systems is that they are far from the equilibrium because of their dissipative structures (Capra, 2005).

As complex systems are perceived to be far from the equilibrium, they have non-linear and emergent properties. Non-linearity is the rejection of the proportionality of cause and effect (Blackman, 2006; Sweeney and Griffiths, 2002). This is the idea that small changes in one part of the system can have large effects across the whole system (Kernick, 2006).

Complexity can arise with the interaction of elements within a complex system. As a result of this interaction it is not as simple as 'A causes B' (Blackman, 2006). Instead, complexity arises when there is an 'interaction between many elements, such as the relationship between A and B depending on interactions with C, D or E' (Blackman, 2006, p.31). Emergent properties are also essential to dissipative structures. The emergence of new structures is a result of interacting trajectories that take place within open systems, causing novel properties to emerge (Gatrell, 2005). Emergent properties are also due to self-organisation, which is the ability of the system to adapt to changes in the environment (Cilliers, 1998).

As complex systems are open, they are not separate from the world that surrounds them. Instead, they are open to external influences (Curtis and Riva,

[5] When referring to a 'system', in its widest sense, what is meant is to denote any group of things, objects, entities or phenomena (Durie and Wyatt, 2007).

2010) and this makes it difficult to define their boundaries (Blackman, 2006). Subsequently complex open systems have been described as having 'fuzzy boundaries' (Joyce, 2007, p.65).

Importantly, complexity theory concentrates on the interacting relations between elements in a complex system. At the core of Bourdieu's work is relational thinking as he argues that social reality lies in relations. Gatrell adopts Bourdieu's relational thinking and links it to the mapping of health inequalities (Gatrell, 2004). There has been a call for health geographers to adopt a relational approach in their understanding of health (Cummins et al., 2007; Curtis and Riva, 2010). Relationality is a core element of complex systems, since it is the relations with other components of the system that are vital to the understanding of how complex systems operate. For instance, well-being is an example of a complex system. Joyce (2007) argues that well-being is more than just simply the proper functioning of physiological systems. Rather, it is the result of fine and delicate inter-relationships between multiple factors, including social, physical and psychological dimensions. Likewise, Sweeney and Griffiths (2002) point to the multiple interacting processes involved in health, which can be viewed as a result of an intertwining of genetic, personal, family and social factors. By taking into account the different sets of relationships and interacting processes involved in complex systems, such as health, complexity theory is characterised as being anti-reductionist. It is viewed as holistic as it acknowledges that a system must be analysed not just by the sum of its individual components but in terms of the interactions between these components (Cilliers, 1998).

Complex systems are also path-dependent, so 'history matters' (O'Sullivan, 2004; Byrne, 2005). This logic fits with health geographers' understanding that health and disease need to be considered within their broader political, social and economic contexts, which evolve over time and space (Curtis and Riva, 2010). Byrne argues that 'complexity theory challenges the nomothetic programme of universally applicable knowledge at its very heart – it asserts that knowledge must be contextual' (Byrne, 2005, p.97). The idea that population health is largely shaped by the past is of particular importance to understanding the findings in this research and is something that will be returned to on many occasions.

Complexity theory has been criticised and argued to be merely *old wine in new bottles*. Admittedly it does encompass some elements of other theories, such as actor network theory, chaos theory and systems theory. Actor network theory (ANT) is a networked approach which explores the linkages and relationships between a variety of actors (human and non-human) that make up a network (Murdoch, 1997). Proponents of this theory suggest that the social is nothing more than patterned networks that consist of heterogeneous elements (Law, 1992). Relationality is a key concept involved in ANT, which is equally significant in complexity theory.

Chaos theory has also been used in tandem with complexity theory by some authors (Byrne, 1998; Urry 2003). However, Rickels *et al.* (2007) have noted that chaotic systems, while they are similar to complex ones, since they have interacting processes and intricate dynamics, have very few interacting processes in comparison to complex systems that are highly composite ones,

with large numbers of interacting processes. Moreover, chaotic systems do not self-organise whereas complex systems do.

Lastly, systems theory is similar to complexity theory. Systems theory is about 'relationships, patterns, processes and context' (Capra, 2005, p.33). It states that all living things have dissipative structures. However, Walby (2007) criticises the ability of systems theory to allow the theorisation of multiple sets of social relations in the same domain and its limited ability to theorise simultaneously multiple inequalities without a hierarchical relationship. Complexity theory, on the other hand, is argued to be able to theorise multiple sets of social relations and interactions between these relations (Walby, 2007).

Recently, complexity theory has been applied in the field of health geography. Curtis and colleagues (2009) assert that complexity theory is relevant in the study of health and health care systems. They conducted research into contemporary models of psychiatric care for people with mental illnesses, which focused on deinstitutionalisation of care. Contemporary models of psychiatric care promote 'acute' hospital units, with the aim of aiding people with mental illness when they are undergoing serious phases of their illness and then placing them back into the community as outpatients once they are able to cope. These researchers talk about the notion of 'permeability', which is argued to be reflected in the amount of short patient stays and the relatively high turnover with patients going back into the community as outpatients. They talk about 'managed permeability' as contemporary psychiatric units aim to serve in this way, limiting inpatient care and increasing community care outside of the hospital environment. They view the hospital as a sort of system that is envisaged by complexity theory; a complex system that is characterised by

dynamic interrelations between its various components. They argue that we are not able to understand the hospital by simply partitioning it into its component parts, since they interact with each other (such as wards, public spaces, and the surrounding locality). They suggest that the 'complex unbounded spaces of psychiatric care' are often difficult to predict and manage and that 'the distinction between what occurs inside and outside the hospital is blurred' (Curtis *et al.*, 2009, p.341).

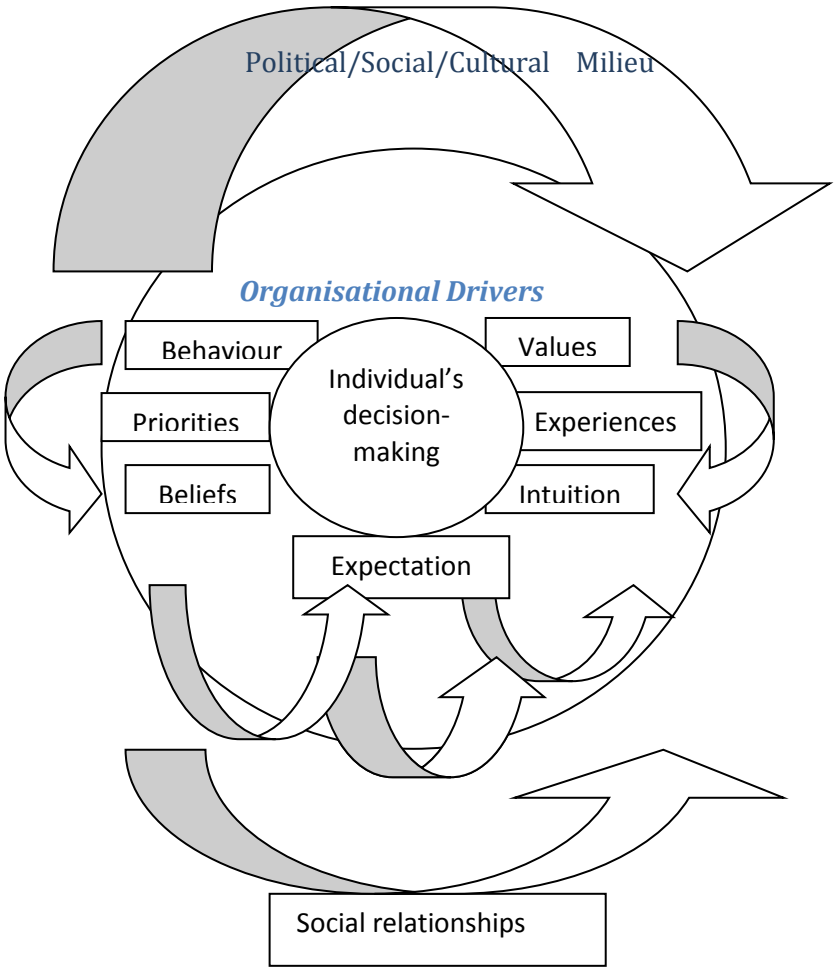
Similarly, Milligan (2001) argues that there is a need to place the analysis of health care within its wider social, economic and political context, recognising that places have their own historical, socioeconomic and political backgrounds. She states that a networked approach is required, one that takes all of these factors into account. She argues that ANT is an effective theoretical framework that offers a networked approach which is able to include all of these factors. Likewise, the above arguments that Milligan makes about the necessity of having a relational approach like ANT, which recognises the importance of wider influences and multi-levelled contexts within which health care policy is mediated, are broadly compatible with the theoretical framework that complexity theory envisages.

Joyce (2007) also adopts a relational approach by using complexity as a theoretical framework to address issues involved in public health decision-making. She argues that contemporary public health advocates a move away from traditional positivist and reductionist understandings of population health to a more complex, non-linear understanding of population health problems. Complexity theory is considered to be an appropriate approach for public health decision-making as it considers the various layers of complexity that are

involved. She contends that the use of linear and reductionist approaches to explore public health problems can lead to 'misunderstanding and de-contextualisation' (Joyce, 2007, pp.77-78). In contrast, complexity theory takes into account the inter-relational processes and pathways involved in public health and these should thus be concentrated on in decision-making, which should prevent de-contextualisation and misunderstandings from occurring.

Complexity theory has some notable limitations. Ontologically, the predilections of complexity theory are contested. Reed and Harvey (1992) and Byrne (1998) argue that complexity theory comes under critical realism, whereas Manson and O'Sullivan (2006) argue that complexity theory does not have an all-encompassing ontology. The latter assert that because complexity theory focuses on entities and relations among them, the breadth of this perspective allows the application of ideas from complexity theory across realist and constructivist approaches.

Figure 2.3: Pathways between inter-related variables in public health decision-making



Source: Joyce (2007) p.81

Without doubt there is a sense of ambiguity surrounding complexity theory's ontological commitments. This thesis works with the premise that complexity theory is critically realist, since this perspective treats nature and society as ontologically open and historically constituted, interactively complex, non-reductive and indeterminate (Reed and Harvey, 1992), which fits neatly with the theoretical framework offered by complexity theory. Complexity theory is also limited when moving away from a conceptual to an empirical application as it is still in its early stages. However, it is argued in this thesis that it is useful for

theorising about the relationship between place and health and the production of 'health resilience'.

Therapeutic places

A *therapeutic landscape* is defined as…

> …a place that is conducive to physical, mental, spiritual, emotional and social healing… (Gesler, 2003, p.1)

Will Gesler first coined the term therapeutic landscape in the early 1990s in his article entitled *Therapeutic landscapes: Medical issues in the light of the new cultural geography*, in which he discusses the healing properties of places. This concept has been instrumental for recognising that places are important for physical, mental and spiritual well-being. There are four environments that make up therapeutic landscapes as put forward by Gesler: the natural; built; the social; and the symbolic. Natural environment refers to the natural surroundings, such as nature, water, and fresh air, which are often thought to have curative properties. The built environment includes our homes, schools, workplaces, parks and so on and encompasses all buildings, spaces and products that are created or modified by people. A social environment refers to community, culture, social networks and such like. Lastly, a symbolic landscape places emphasis on the symbolic significance of places.

Since its conception in the 1990s, the therapeutic landscape concept has evolved in health promotion research by recognising that places may have health-enhancing effects (Frumkin, 2003; Milligan *et al*., 2004; Williams, 2009). This is a significant development and is in line with the approach that will be

adopted in this research; one that seeks to explore social, physical (natural and built), and symbolic features of 'health resilient' areas that are health-enabling.

Sense of place and *rootedness* are two themes that are strongly linked to the therapeutic landscapes concept, which is based on the premise that environments hold meaning, significance and value for people (Williams, 1998). These are often discussed in relation to wider concepts, such as place attachment and place identity.

Place attachment and place identity

The concepts of place attachment and place identity are rooted in the work of environmental psychology – a field of research dedicated to examining the interplay between humans and their surroundings (Proshansky *et al*., 1983); however, the concept has also been taken up by human geographers (Tuan, 1980; Buttimer, 1980).

Place attachment has been defined as 'an affective bond or link between people and specific places' (Hidalgo and Hernández, 2001, p. 274). Place attachment has been examined in health geography research. Joseph *et al.* (2009) found that place attachment was protective and positively influenced health in older people in New Zealand.

Place identity refers to the personal attachment acquired by individuals to their environmental surroundings, in which they develop a sense of belonging. Proshansky *et al.* (1983) talk of 'spaces and their properties which have served instrumentally in the satisfaction of the person's biological, psychological, social

and cultural needs' (p.59). It is a personal construction which 'grows out of direct experiences with the physical environment' (Proshansky, 1983, p.62).

Place attachment, or sense of place, is increasingly being examined in relation to health and well-being with Eyles and Williams (2008), for example, arguing that it is vital for health at both the individual- and the community-level. Gesler's (1991) *therapeutic landscapes* concept has also been instrumental in recognising that places and 'rootedness' are important for physical, mental and spiritual well-being (Gesler, 1992, p.738).

Biophilia, Attention Restoration Theory and Topophilia

The *biophilia* hypothesis has been described by Kahn (1997, p.1) as:

> a fundamental, genetically based human need and propensity to affiliate with other life and lifelike processes

The theory underpinning biophilia argues that 'our response to nature today is influenced by universal, inherited human characteristics, which would have conveyed primeval evolutionary advantages for the human species' (Curtis, 2010, p.38). Curtis states that according to this theory humans have preferences for natural settings, which offer 'resources for life and protection' (Ibid.). Such settings may include waterscapes, green spaces, and so forth. Some limitations of biophilia include the deterministic argument underlying the theory (as not everyone is driven entirely by genetic make-up), an individual's affiliation with the 'un-natural' (landscapes that may include aspects of the built environment for instance), and biophobia (those who are repelled by natural landscapes). Kahn (1997) uses the phrase 'mediated biophilia', which refers to

the cultural and experiential influences of our responses to natural settings that may either reinforce or weaken our tendencies towards biophilia. Some people may have a propensity for natural environments, whereas others may find them unlikeable and even threatening. However, it could be argued that such views may be related to broader social determinants, e.g. not feeling safe in these environments. Nonetheless, many studies have demonstrated a positive association between natural environments, particularly green spaces, and health. For example, Mass *et al.* (2006) found that those residing in 'green areas' reported less poor health than those with 'less green' surroundings. Access to a garden or living only a short distance from green spaces are also associated with lower levels of stress and a decreased likelihood of obesity (Nielson and Hansen, 2007). Research also indicates that place can impact on health by attention restoration, stress reduction and/or evocation of positive emotions (Abraham *et al*., 2010).

Attention Restoration Theory (ART) was developed by environmental psychologist, Stephen Kaplan (1995), to conceptualise human-environment relationships. Like the therapeutic landscapes concept, ART argues that nature can have restorative effects. There are four requirements for a restorative environment: being away (a sense of freedom is invoked); fascination (with natural settings); extent (to qualify the environment as a whole other world); and compatibility (the environment must fit one's purposes and inclinations).

Yi Fu Tuan coined the term *Topophilia* and this concept may also be another way of thinking about the significance of place for health. The term is derived

from two Greek words: 'topos' meaning *place* and 'philia' meaning *love*. So the term literally translates as 'love of place'. Tuan defines it as 'all of the human being's affective ties with the material environment' (1974, p.93). Tuan's concept goes beyond the biological response to certain places and leads us to consider more culturally influenced responses to places. Curtis argues that the topophilia concept 'encourages us to be sensitive to the culturally constructed and historically variable character of landscapes which are viewed as beneficial for human well-being' (2010, p.55).

Summary

This chapter has considered multiple ways of theorising and conceptualising about geographical health inequalities and aspects of places that may either promote health or be detrimental for health. There is no one grand theory that can explain how health inequalities or 'health resilience' are produced. As such this thesis will draw upon several theoretical and conceptual frameworks that have been outlined in this chapter in order to shed light on place features that may impact positively on population health in economically deprived areas.

The value of a 'health resilience' approach is that instead of thinking about attributes of an area that may be detrimental to health, it explores the positive experiences of place for health, either in a therapeutic or a health-enabling way that is conducive to the production of good health. As a result, this research will consider the availability and access to health-relevant resources. Drawing on health inequalities research at the area-level, it will examine the role of wider social determinants of health in order to ascertain a better understanding of possible protective processes operating in economically deprived areas. In

order to better understand area-level 'health resilience', this thesis will draw upon the interaction of contextual and collective explanations; different forms of capital such as natural and social; place attachment and identity; and therapeutic landscapes.

Chapter 3

Methodology

This chapter outlines the research approach adopted in this doctoral study. Firstly, the research aims and objectives are presented along with the research design that seeks to address these. Secondly, mixed-methods research and the underlying rationale for integrating quantitative and qualitative research will be discussed in depth. The barriers of bridging the two supposedly epistemologically conflicting research paradigms are considered alongside the potential uses of combining them. Following on from this the research methods (statistical and secondary data analysis, focus groups, interviews, informal conversations and observation) deployed in this study will be presented. Finally, I reflect on my own positionality, issues of power in the research process, and ethical considerations related to the research.

Research aims and objectives

There are two primary research aims of this doctoral study. Firstly, taking into account previous studies that have identified some deprived areas that do better than expected in terms of health (Doran *et al*., 2006; Tunstall *et al*, 2007; Mitchell *et al*., 2010; Cairns *et al*., 2012), it seeks to identify deprived areas in England, with a particular interest in areas in North East England (NEE) that exhibit better health outcomes than would be expected given significant

economic adversity. It is anticipated that there will be areas located in NEE that will do better in health despite long-term deprivation based on the findings of the aforementioned studies. Secondly, once these areas have been identified, it seeks to explore protective factors that may help to militate against the detrimental effects of deprivation and poor health, and thus to develop an understanding of mechanisms underlying such 'health resilience'.

The research objectives are to think critically about the concept of 'health resilience' with respect to both the ways in which it has been conceptualised and operationalised previously and how it has been taken forward in this thesis. It is hoped that this thesis will contribute to academic understandings of 'health resilience' and spatially varied experience of living in deprivation, with the ultimate objective of informing local and national policy discussions on the development of area-based interventions which seek to tackle health inequalities.

Research design

This thesis adopts a mixed-methods approach to identify and understand how 'health resilience' may operate in overachieving deprived areas, by combining statistical analysis with an in-depth qualitative case study. The challenges of conducting mixed-methods research will be considered shortly; however, the approach was chosen in order to best address the research questions, presented in ***Chapter 1***. The rationale that underpins this decision to use mixed-methods is what may be known as 'pragmatism'. Brannen's statement below best reflects the reasoning of combining methods into a research design.

> [...] different methods chosen to answer different aspects of research design and different research questions.
>
> (Brannen, 2005, p.182)

This certainly applies to this research as the methods were chosen to best address the research questions. Statistical analysis alone would not be able to address all of the research questions, nor would qualitative research, thus it felt imperative to bring the two approaches together.

Mixed-methods research is increasingly being applied in the field of social sciences. This is reflected by the development of a journal dedicated solely to mixed-methods research entitled *Journal of Mixed Methods Research*, which was established in 2007. Nevertheless, discussion and application of mixed-methods research was already well underway prior to this establishment.

Traditionally, the discipline of human geography, like the social sciences more generally, has been involved in a long-standing quantitative-qualitative divide, at the centre of which is epistemology. For many social science researchers, epistemological frameworks are fundamental to the research process, since they provide a way of knowing about the social world (Filstead, 1970). Those who pledge allegiance to either the quantitative or qualitative camp do so because of their 'purist' belief that these research methods 'stem from different ontologic, epistemologic and axiologic assumptions about the nature of research' (Onwuegbuzie and Leech, 2005, p.375). Epistemology, as defined by Bryman, is a 'question of what is [or should be] regarded as acceptable knowledge in a discipline' (2008, p.13). For this reason, researchers have regarded epistemology and research methods synonymously.

In response to epistemological discourses in social science research, what is known as ‘paradigm wars’ have emerged (Smith and Heshusius, 1986). In the Kuhnian sense, research paradigms are ‘incommensurable’ and have ‘divergent epistemological bases’ (Bryman, 1984, p.79). For this reason there has been a mainstream reluctance to use quantitative and qualitative research methods in conjunction with one another. Nonetheless, some social science researchers have challenged the notion of incommensurability between the two research paradigms. Proponents of mixed-methods research argue that epistemological considerations must not dictate which research methods are used; rather they argue that there is a ‘growing preparedness to think of research methods as techniques of data collection or analysis as opposed to being encumbered by epistemological’ considerations (Bryman, 2008, p.624). As a result, epistemology is de-centred from the selection of research methods for those who attempt to bridge the quantitative-qualitative divide and embark on a mixed-methods approach to doing research. ‘Pragmatism’ is now believed to be the underlying driving factor in the adoption of mixed methods research (Tashakkori and Teddlie, 2003; Johnson and Onwuegbuzie, 2004; Bryman, 2008, Denscombe, 2008).

According to the quantitative-qualitative divide, epistemological considerations are inherent in the types of methods that are used for social research.

> Whether they are treated as such or not, research instruments and methods cannot be divorced from theory; as research tools they operate only within a given set of assumptions about the nature of society.
>
> (Hughes, 1990, p.11)

Yet this is not the case for all social science researchers, particularly for those who integrate both quantitative and qualitative methods into a single research project. More contemporary work conducted by health geographers is illustrative of this move away from epistemological determinations of research methods to a more pragmatic approach to research. Health geographers have used mixed-methods research in a complementary manner (Dummer, 2008). For instance, Mitchell and colleagues (2009) used a mixed-methods approach by combining secondary data analysis with in-depth interviewing to better understand factors underlying 'health resilience'. The argument for uniting both approaches in this study was to complement and reinforce their findings. Bryman's study of mixed-methods research also supports this as his results discovered that the primary rationale for combining quantitative and qualitative methods was 'complementarity' (Bryman, 2006, p.107). Other findings from Bryman's study signalled that mixed-methods are used for triangulation, development, expansion and initiation purposes. Consequently, epistemology is displaced in the utilisation of mixed-methods research, which weakens the assumption that specific methods imply particular epistemological positions.

Pragmatic researchers reject the notion that quantitative and qualitative methods are incompatible and mutually exclusive; rather they argue that a 'false dichotomy' exists between them (Onwuegbuzie and Leech, 2005, p.376). Unlike purist researchers, they propose that mixed-methods research often results in research superior to mono-method research. For human geographers, mixed-methods research can be seen as a product of postmodernism, which embraces diversity, as can be seen in the following:

> The multi-methods approach represents a polyvocal approach to research, where employing a range of methodological strategies means that the researcher does not necessarily privilege a particular way of looking at the world. (Philip, 1998, p.261)

Postmodernism has thus encouraged a shift to methodological pluralism, which enables the researcher to break away from the traditional shackles of quantitative and qualitative research paradigms, which are deeply rooted in epistemological predilections. Proponents of mixed-methods research have argued that this approach can be used to generate better findings through complementarity and triangulation. However, Sale and colleagues (2002) reject the argument that mixed-methods can be used for triangulation or cross-validation purposes. According to these authors mixed-methods can only be used to complement each other. However, I would reject this, arguing that real integrative mixed-methods research can be both complementary and used for triangulation. Mason argues for mixed-methods research that has the premise of a multi-dimensional logic – which can help we researchers understand and investigate social complexity more fully by drawing on the strengths of different methods (Mason, 2006). This type of approach depends on intersection and forming a dialogue between the methods; they need to speak to each other. This is exactly what I attempt to do in this thesis by working iteratively between the methods, enabling the findings from each to reinforce each other.

It is argued in this thesis that quantitative and qualitative research methods both have strengths and weaknesses, so researchers should utilise the strengths of both methods in order to acquire a fuller understanding of social phenomena. Clearly for some researchers epistemological considerations are no longer

centre stage in the employment of mixed-methods; alternatively it is argued that they are used for pragmatic purposes. It has even been implied that researchers have become 'bored' with philosophical debates and would like to actually get on with their task of doing research rather than talking about it (Bryman, 2006, p.117). However, I propose that research can be both pragmatic and epistemological. I support Sayer's (2000) argument that Bhaskar's (1975) critical realism approach can be compatible with both quantitative and qualitative research methods. The critical realist position concedes that different levels of reality exist ranging from both objective and subjective truths, thus lending itself to mixed-methods research which seeks to obtain both levels of reality. Crucially, critical realism distinguishes between the real, actual and empirical – these are three ontological domains proposed by Bhaskar (Elder-Vass, 2010). The 'real' is whatever exists (natural or social) regardless of whether or not it is an empirical object - it also refers to structures and powers within society whether they are physical or social in nature; the 'actual' is produced by the real and refers to events, or patterns that can be observed; and, the empirical is the domain of experience (Sayer, 2000).

It can be posited that mixed-methods research has changed the ways in which social science researchers think about research. Traditionally, epistemological foundations were at the root of methodology. However, contemporary research approaches, mixed-methods more specifically, have taken a step away from these epistemological underpinnings and argued for pragmatic and technical considerations instead. This has ultimately generated tension, and to a certain extent even conflict in the social sciences, given the traditional epistemological divides that have previously separated out quantitative and qualitative research

methods. Postmodernist claims of multiplicity and pluralism are pertinent to recent mixed-methods approaches as these claims reflect multiple social realities and thus plural ways of knowing about, and researching, the social world. Furthermore, the critical realist approach has received great attention by researchers who accept both objective and subjective ways of researching social reality, which is primarily the viewpoint endorsed in this thesis. That is not to say that I do not think research should also be pragmatic since different research questions can lead to different research designs. However, fundamentally, we should think beyond mere pragmatic decisions to uncover the ways in which we as mixed-methods researchers understand the social world. Therefore, in this thesis I do not consider the two research traditions as incompatible nor do I pledge allegiance to either; instead I adopt a critical realist, mixed-methods approach in order to achieve a fuller understanding of 'health resilience' by drawing upon different types of knowledge. I therefore perceive mixed-methods as complementary, using the strengths of one method to complement the other (Sale *et al*., 2002; Morgan, 2007) as well as for triangulation purposes, which will be demonstrated in this thesis through the way in which I attempt to integrate both quantitative and qualitative research methods.

Statistical Analysis

Data & Sources

Health indicators

The health indicators that I have chosen to examine in this research are five years premature mortality (defined as deaths below the age of 75) between the years 1998 and 2003, self-reported not good general health and limiting long-

term illness in 2001. These indicators were chosen because they reflect different facets of population health (both aspects of morbidity and mortality) and thus capture a multi-dimensional analysis of (ill)health. The decision to have five years of deaths data was due to the geography that I decided to use (including wards and smaller geographic units) since ward populations are too small and as a result researchers need at least 5 years of data to make the numbers large enough to examine. The decision to examine the years 1998-2003 for premature deaths was made in order to use the 2001 Census population as a denominator. All health data examined in this study were indirectly standardised using England as reference population in order to take into account differences in age and sex structures.

Indirect Standardisation

The first part of the statistical analysis involved standardising all of the health variables used in this research. Standardisation is a technique applied to health data in public health in order to control for differences associated with the age and sex composition of the population (Curtis and Taket, 1996). The rationale behind the standardisation of health variables is to accurately compare different area population health without getting misleading results. Misleading results would occur if crude rates were used to compare differences in population health (Kirkwood and Sterne, 2003) as crude rates ignore differences related to age and sex.

There are two different types of standardisation that may be applied to health data: direct or indirect standardisation. There is, however, an important difference between the two, which is that indirect standardisation is highly

robust when working with small numbers (direct standardisation is excluded in this case), something that applies to this study.

Standardised Mortality/Morbidity Ratios (SMRs) are calculated using the following formulae:

SMR= Total observed SMR / Total expected SMR * 100

In order to calculate the total SMR for an area, SMRs for each age group for males and females must be calculated first. Tables 3.1 to 3.3 display the process of calculating SMRs using indirect standardisation for one area (example based on Durham) examined in this research. The first step is to identify a reference population that makes sense. In this case, England is used as the reference population, since the analysis examines areas throughout England so it makes sense to compare against the national average. The second step is to calculate multipliers based on this reference population (see Tables 3.1 and 3.2). Expected counts are then generated using these multipliers and based on the age/sex structure of the population of interest, in this case Durham. Once expected counts are produced for males and females the total number of expected counts is compared with observed number to produce an SMR.

Table 3.1: First stage of indirect standardisation

1. Males (5-year age bands)	**2.England population (2001)**	**3.England LLTI (2001)**	**4.Multipliers (Column 3/Column 2)**	**5.Durham population (2001)**	**6.Durham Expected LLTI (2001) (Column 4*Column 5)**
0-4	1,496,435	51,460	0.034	2,084	71
5-9	1,597,648	86,912	0.054	2,310	125
10-14	1,634,992	90,890	0.056	2,443	137
15-19	1,464,444	77,026	0.053	3,677	195
20-24	1,383,422	84,377	0.061	4,626	282
25-29	1,567,562	110,829	0.071	2,508	178
30-34	1,832,614	152,291	0.083	3,148	261
35-39	1,896,895	189,986	0.100	3,287	329
40-44	1,705,566	208,408	0.122	2,985	364
45-49	1,531,044	233,639	0.153	2,792	427
50-54	1,666,074	318,356	0.191	3,163	604
55-59	1,369,926	352,356	0.257	2,634	677
60-64	1,166,536	422,766	0.362	2,190	793
65-69	1,026,327	406,809	0.396	1,792	710
70-74	875,567	387,701	0.443	1,517	672
75-79	671,119	349,407	0.521	1,085	565
80-84	391,349	228,600	0.584	588	343
85-89	175,347	115,784	0.660	252	166
90+	57,392	39,453	0.687	102	70

Table 3.2: Second stage of indirect standardisation

1. Female (5-year age bands)	**2.England population (2001)**	**3.England LLTI (2001)**	**4.Multipliers (Column 3/Column 2)**	**5.Durham population (2001)**	**6.Durham Expected LLTI (2001) (Column 4*Column 5)**
0-4	1,426,811	37,563	0.026	1,966	51
5-9	1,521,351	57,311	0.038	2,188	83
10-14	1,564,560	64,762	0.041	2,346	96
15-19	1,410,282	69,044	0.049	3,682	180
20-24	1,422,528	81,320	0.057	4,379	250
25-29	1,647,753	108,253	0.066	2,593	171
30-34	1,918,809	152,279	0.079	2,998	237
35-39	1,957,677	191,942	0.098	3,223	316
40-44	1,735,243	214,742	0.124	2,928	363
45-49	1,563,566	249,788	0.160	2,834	453
50-54	1,698,611	348,026	0.205	3,255	667
55-59	1,399,697	374,401	0.267	2,541	678
60-64	1,211,398	379,954	0.314	2,267	712
65-69	1,111,463	403,242	0.363	1,944	706
70-74	1,046,909	451,544	0.431	1,833	790
75-79	925,655	490,741	0.530	1,526	809
80-84	643,858	397,203	0.617	1,056	652
85-89	370,086	264,821	0.716	666	477
90+	161,634	125,188	0.775	304	236

Table 3.3: Final stage of indirect standardisation

1.Local Authority Name	**2.Total Observed LLTI**	**3.Total Expected (Total males expected + Total females expected LLTI)**	**4.SMR (Column 2/Column 3)*100**
Durham	16,559	14,896	111

Measure of Deprivation

The Townsend score was the preferred measure of deprivation since these scores are comparable over time, unlike the Index of Multiple Deprivation (or Indices of Deprivation as it is now recognised), which uses different indices for each domain (income, employment, and so forth), each year thus denying the possibility of comparing deprivation over time. The Townsend measure of deprivation is also useful when wanting to examine deprivation in small geographic areas, such as wards. However, as I will shortly discuss, variables used to create the Townsend score from the decennial Census are not directly comparable as geographic boundaries, including CAS wards and Local Authorities, are frequently revised.

Townsend scores are created using four variables: % unemployed; % households overcrowded; % non-house owners; % non-car owners. These are from the UK decennial Census and they are used to calculate Townsend scores. The method to calculate the Townsend scores is as follows: percentages of the above four variables are converted into z-scores (standardised scores using England as a reference group) and then these scores are summed to produce a composite score. Before this can be achieved the unemployment and overcrowding variables must be log transformed to produce a more normal distribution (Townsend *et al*., 1988a). Log transformation can be computed in any statistical software package. I calculated these scores in the Statistical Software Package for Social Sciences (SPSS), version 17.0.

There are several gateways to accessing Census data including CASWEB, NOMIS and Neighbourhood Statistics; however, I used the 'Linking

Censuses Through Time' website to download the necessary variables in the 1971, 1981 and 1991 Censuses at pre-2009 Local Authority level since I was able to download the data to correspond with the Local Authority boundaries in place during the 2001 Census. Examining long-term economic deprivation and health data over time is not a straightforward task as routinely published data pre-1991 does not fit consistent boundaries, which can make it extremely difficult to examine trends over time. Nevertheless, with the 'Linking Censuses Through Time' project I was able to trace economic deprivation back to 1971 at consistent boundaries at Local Authority level. I then used the NOMIS website to access and download 2001 Census data and calculated Townsend scores.

I encountered some difficulties trying to obtain consistent boundaries for ward-level deprivation data (1971 to 2001). I therefore started to create a Geographically Converted Table (GCT), which is a well-known method that involves using postcode directories in order to link from a source geography (for which the data pre-exist) to the target geography that one wishes to examine. Research that has conducted such analysis describes the processes involved in creating a GCT:

> Within a 'geographic conversion table' [GCT], as a proxy for population distribution, address count-weighted postcode distributions are used to calculate intersection weights between the source [1991 ward] and target [2001 ward] geographies.
>
> (Norman, 2010, p. 113)

Whilst I was researching this method and asking questions, I discovered that this work (examining Townsend measure of deprivation at ward level between 1971 and 2001) had already been completed for another project. The main researcher of the project, Dr. Paul Norman at the School of Geography, University of Leeds, kindly gave me access to these GCT outputs (Townsend scores 1971 - 2001 at CASWARD level) so the GCT method was no longer required.

Health and deprivation data for this research that have been outlined in the above sections were obtained from several sources, which are summarised in Table 3.4.

Table 3.4: Health and deprivation data sources

Data	**Geography / Year**	**Source**
Deprivation data to construct Townsend scores (Unemployment, Renting, Overcrowding & Car Ownership)	Local Authority, 1971-1991	Linking Censuses Through Time (LCTT) Research Project
Deprivation data to construct Townsend scores (Unemployment, Renting, Overcrowding & Car Ownership)	Local Authority & LSOA, 2001	Nomis
Townsend scores	Census Area Statistic Ward (CASWARD) level, 1971-2001	Paul NormanPart of another research project
Premature deaths data (Under 75 years old)	England, Local Authority & CASWARD, 1998/1999 – 2002/2003	Office for National Statistics (ONS)
Self-reported general health	England, Local Authority, CASWARD & LSOA, 2001	Nomis
Self-reported limiting long-term illness	England, Local Authority, CASWARD & LSOA, 2001	Nomis

Spatial Scale & Units of Analysis

> If the study of neighbourhoods and health is to move forward [...] it is crucial that we have better models and theories about how neighbourhoods may influence health and that we use them to determine the appropriate scale and type of area influence we wish to measure.
>
> (Macintyre and Ellaway, 2003, p.35)

It is important to think about *why* scale makes a difference to the study of population health both theoretically and methodologically. Theoretically, geographies have different social organisations which will influence health outcomes. Methodologically, altering spatial scales will determine 'the level at which variability in the outcome is examined and consequently [about] what inference can be made' (Diez-roux, 2003, p.46).

There are undoubtedly multiple levels of organisation in studying the social determinants of health (Diez-roux, ibid.). Local Authorities will be examined in this thesis as they are responsible for covering many of the wider determinants of health including housing, education, transport, leisure facilities, and social services. In addition, a more fine-scale approach will be taken which will also examine health outcomes and factors that may influence 'health resilience' in smaller areas, wards. This approach would allow for the exploration of whether or not deprived Local Authorities do better because they have some outstanding smaller areas.

Conducting the analysis at a smaller scale is also an appropriate methodological step, since factors such as social capital that may be found to buffer against deprivation effects may be more evident at a community level. It is recognised that there are many disputes over what constitutes a 'community' and deep reservations over definitions of communities that are bounded by geography; while wards or Lower Super Output Areas (LSOAs) may not reflect actual 'communities' they are more likely to be socially homogeneous and locally meaningful boundaries compared to Local Authorities or such like. With this in mind, by examining wards and LSOAs as well as Local Authorities I intend to uncover factors operating at different levels, which has not been done in previous research on area 'health resilience', all of which has focused on a higher unit of analysis (higher level analysis may hide smaller areas within them that overachieve in health as the mean will average out health outcomes).

Due to the limitations of previous studies of 'health resilience' at the area-level in examining large and heterogeneous units of analysis, this study examines three different geographic scales: Local Authority District (LAD); Census Area Statistic Ward (CASWARD); and Lower Super Output Area (LSOA). Previous research has considered large geographic units (including Parliamentary constituencies and LADs), which may mask significant variation within areas as has already been discussed. Aggregation will most definitely result in a loss of information. According to Townsend *et al*. (1988a), 'when data are aggregated for larger areas, a lot of the telling evidence can become blurred' (p.78). Therefore, this thesis has examined various geographic scales in order to capture any variation *within* areas.

CASWARDs nest neatly into LADs; however LSOAs are not coterminous with CASWARDs. They sometimes overlap, which means that a proportion of an LSOA may fit into one ward and another proportion into another. The advantage of LSOAs, however, is that they do not change over time, unlike wards. The limitation is that they did not exist until the 2001 Census, thus denying the possibility of examining deprivation or health at LSOA level prior to 2001. Subsequently, deprivation can only be measured in 2001 for LSOAs (census data was derived from NOMIS to calculate Townsend scores at LSOA level in 2001). Table 3.5 displays the total number of areas and population sizes for the units studied.

Table 3.5: Geographic units

Area Name	**Country/Region**	**Total number of areas (in 2001)**	**Average population size (in 2001)**
Local Authority District (LAD)	England/All regions	*N*= 354	57,770
Census Area Statistical Ward (CASWARD)	England/All regions	*N*=7942[6]	2,570
Local Super Output Area (LSOA)	England/North East region only	*N*=1656	1500

Geographical boundaries are often arbitrary as they are dictated by political and administrative decisions. As such they are drawn and then re-drawn

[6] This figure (*N*=7942) excludes CASWARD if population size is <200 for any of the decades (1971,1981, 1991, or 2001) and City of London & Isles of Scilly CASWARDS merged.

continuously. Pre-2009 local authority boundaries are used in this paper since in the 2009 local government reorganisation some LADs were merged, influencing mainly local geographies of the North East, the West Midlands and the South West. As a result, eight former coalfield communities have been collapsed with other non-coalfield areas into two larger districts of the North East region: Durham (including former coalfield communities of Durham, Easington, Sedgefield, Derwentside and Chester-le-Street) and Northumberland (Blyth Valley, Wansbeck and Alnwick). Due to the loss in variability between coalfield areas incurred by this reorganisation (example of the North East but also similar for other regions), this research decided to work with the former 2001 geography. Moreover, by collapsing LADs into larger geographies we may miss variations and certainly the deprivation profiles may be diluted. Therefore, for these reasons it is felt that pre-2009 boundaries are more appropriate for the purposes of this analysis.

Modifiable area unit problem

The spatial scale that area-based deprivation indices are calculated at will ultimately have an impact on the values produced. The Modifiable Area Unit Problem (MAUP) is of prime concern to geographers examining population health and is a concern related to the problem that 'occurs when inferences – based on spatial analysis – change when the same data are analyzed using either variations in administrative zoning or through difference scales' (Schuurman *et al*., 2007, p.596). Schuurman and colleagues (2007) assert that the issue of scale effects in MAUP is more of a problem particularly when using deprivation indices. They demonstrate through their analysis of self-reported health in Vancouver (at different geographic scales) that 'scale

matters'. They found a more pronounced health and deprivation gradient at the finest scale due to granularity and as a result they argue that we should seek to use the smallest unit of analysis that is possible.

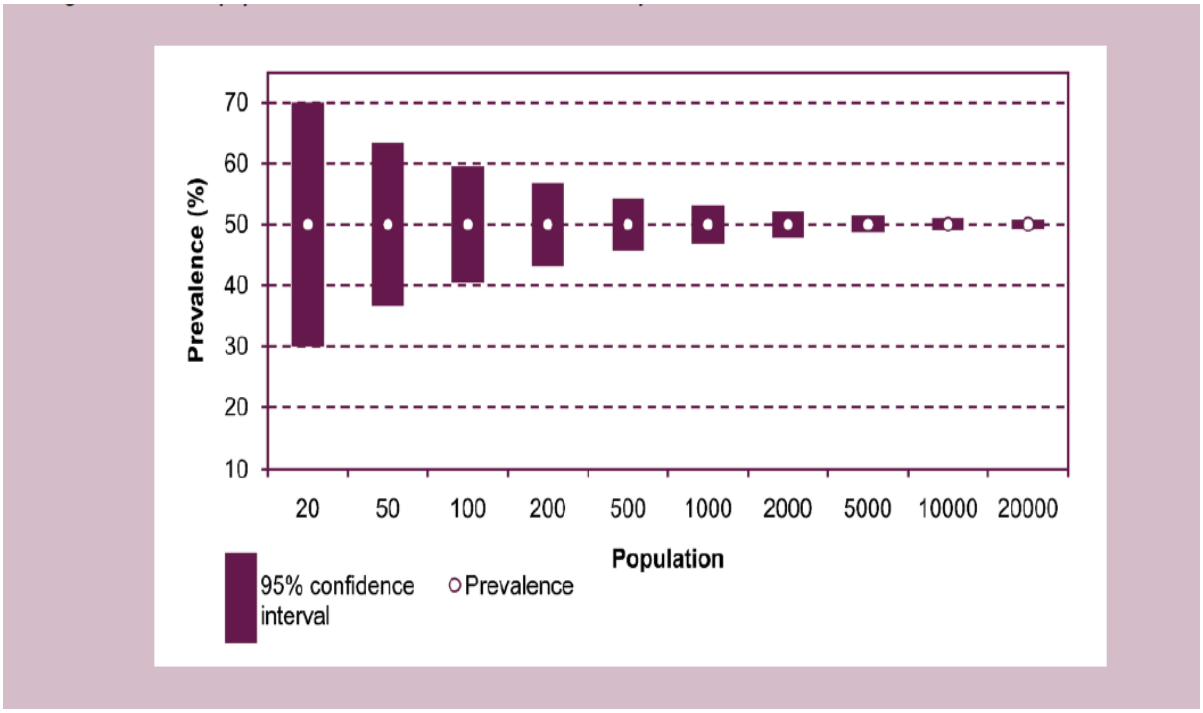
Advantages and limitations of small geographic units

There are several advantages and limitations of using small geographies in health geography and public health research. In terms of advantages, the main one is the increased 'granularity' of the results (Watson *et al*., 2009, p.5). As I have reinforced throughout the thesis, in relation to limitations of previous studies on 'health resilience', there are huge variations in large geographies such as parliamentary constituencies and local authorities. Whilst in some respects it may be useful to examine health outcomes at these levels, in other respects it may be misleading, masking important nuances within them. Analysing data at the small area-level also enables more accurate targeting of interventions (Watson *et al*., 2009, p.6). Therefore, I argue that it is signally important to examine data at the smallest geography-scale possible in order to have more fine-grained understanding of what is actually happening more locally.

With regards to some of the limitations of small geographies, they have small populations and as a consequence there are smaller numbers of events such as deaths or hospital admissions, which reduces the reliability of statistics calculated for the small area units. Wide confidence intervals may also emerge, which needs to be addressed. The chart displayed in Figure 3.1 demonstrates that confidence intervals widen with smaller populations and reduce with larger ones. Nevertheless, this need not be off-putting as it may

be overcome in two ways: temporal and spatial smoothing. Temporal smoothing uses several years of health data (5 years is commonly used), which increases the number of events observed for whichever health indicator that is being examined. This is not always possible; however, with for example cross-sectional health data (e.g. self-reported not good health and limiting long-term illness used in this thesis). The other type of smoothing is known as spatial smoothing. The most commonly used one in public health is known as Bayesian smoothing, explained shortly.

Figure 3.1: Confidence intervals for varying population sizes



Source: Watson *et al.* (2009) p.7

I have already established the advantages of examining small geographies but perhaps the real question I should seek to answer is not whether or not to examine data at a small geography but *what* small geography should be used.

When comparing small Census areas versus Electoral areas (LSOAs versus wards, for example) there are a number of considerations to weigh up before deciding which geography to use. Both types of areas have reliable and available population data. Census areas have the main advantage of not changing boundaries over time. In fact, this was the reasoning that underpinned the decision to create them in 2001. Electoral areas, on the other hand, undergo boundary changes periodically with elections and are very much determined by political decision-making. The second advantage of Census areas compared to Electoral ones relates to the size of populations. Census areas have consistent sizes of populations, whereas Electoral areas will have completely varied sizes. Whilst it is apparent that Census areas have many advantages over Electoral areas they are still not familiar to decision-makers, which is the key barrier to using them in public health research. If we want our research to be of wider appeal outside academia we need to use familiar geographic areas to those working in policy circles. They are starting to become more widely used but there is still quite a way to go. This is why I have decided to work with both small areas: LSOAs and CASWARDs.

Bayesian spatial smoothing

At LSOA level, health data were smoothed using a commonly used statistical technique known as Bayesian smoothing. As mentioned earlier in this chapter, LSOA populations are considerably small and as such small numbers of events of deaths or hospital episodes may produce inaccurate standardised ratios for these health measures. As a result the SMRs had extremely wide lower and upper 95% confidence intervals. Therefore,

Bayesian smoothing helps to make these standardised ratios more accurate and narrows confidence intervals. This type of technique has been applied by many studies working in the field of health geography (e.g. Middleton et al., 2008) and public health. It essentially removes 'noise', which is caused by measurement, sampling error or random variation (Baker *et al*., 2008). Smoothing is able to reduce this noise from the data and to highlight underlying trends in such data through this removal. Noise can occur in the health data that I am using, for instance by random and unpredicted events of deaths. The extent of noise related to health data is due to population size and underlying rates of not good health, limiting long-term illness and premature deaths.

This technique was carried out in a statistical software package called OPENBUGS. This is an open source software package. It grew out of WINBUGS, the original project that enabled Bayesian statistical techniques. OPENBUGS is able to cope with a greater array index and due to the number of LSOAs (*n*=1656) this package was the only one that would handle such large numbers of units.

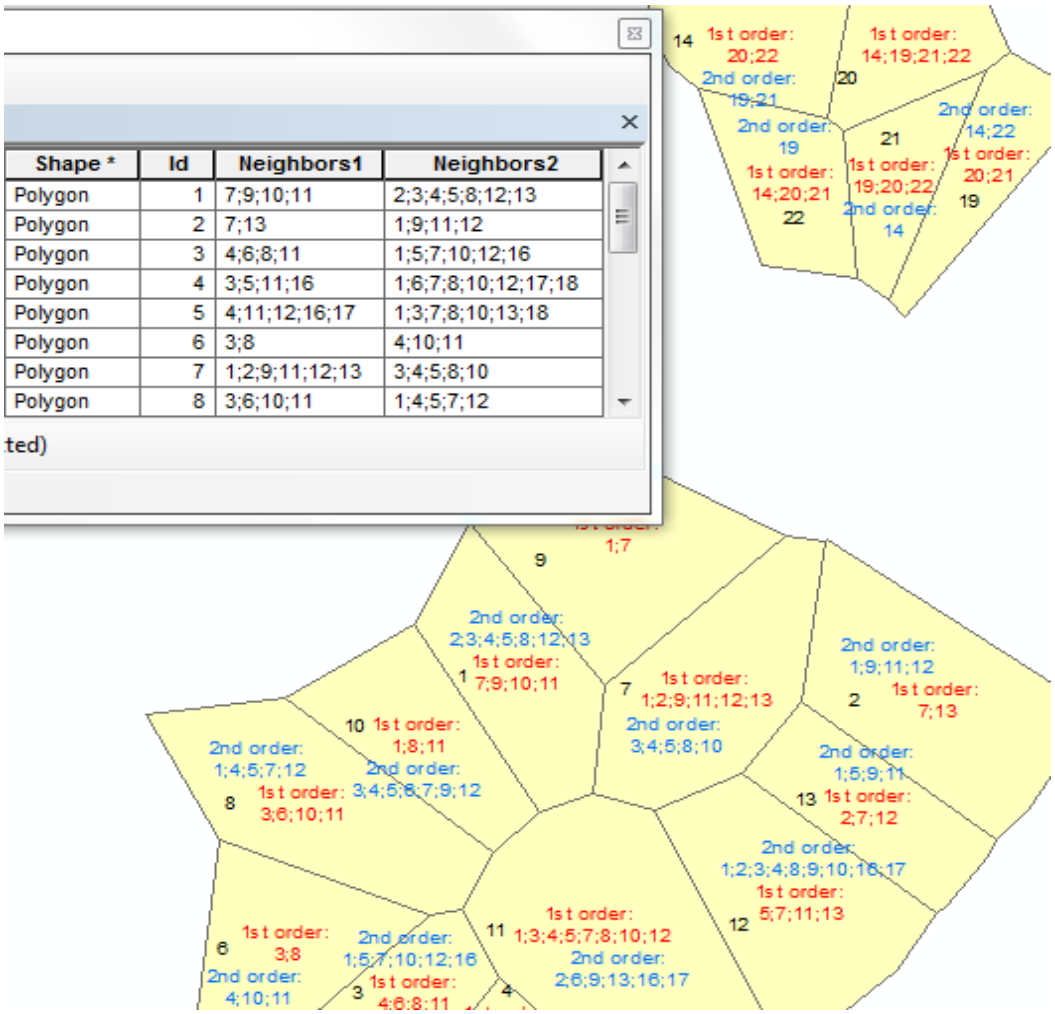
In Bayesian smoothing, observed and expected values (produced via indirect standardisation as described earlier) for all health variables (premature mortality, self-reported not good health and self-reported limiting long-term illness) were smoothed using this technique. What the technique does is borrow characteristics from neighbouring areas, which gives the model greater power. A spatially structured random effect in the model pushes the values towards the mean of the surrounding LSOA areas. Although spatial smoothing borrows properties from neighbouring areas it is still able to detect

local variation as long as the data is not over-smoothed. Therefore reducing noise present in the health data does not mean that local differences are overlooked. Spatial Bayesian smoothing was only carried out for health data at LSOA level since the confidence intervals for CASWARDs and Local Authorities were significantly smaller due to the larger populations, and therefore number of observed cases in these areas.

Find nearest neighbour(s)

In order to carry out spatial Bayesian smoothing one has to be able to locate surrounding neighbours. I produced a file that would locate neighbouring areas in ArcGIS (Version 9.3) using the 'Find Adjacent Neighbouring Polygons' (FANP) command. FANP works by making a list of adjacent and neighbouring polygons in the shapefile (a file that ArcGIS uses to create geographic boundaries).

Figure 3.2: Find Adjacent Neighbouring Polygons Output Source by Maene (2011)



The illustration in Figure 3.2 shows what FANP does – only first order neighbours are of interest in this study. This then produced an FANP Output Text Table Join that can be fed into OPENBUGS.

Spatial autocorrelation

Spatial dimensions of data cannot be ignored. Spatial autocorrelation is based on the premise that nearby areas will share similar characteristics with distant areas. Jerrett and colleagues (2010) use the example of air pollution in the US. They state that they would expect to see similar levels of pollution

between Pittsburgh and the neighbouring city of Johnstown compared with Pittsburgh and Seattle and they argue that this may be due to underlying social and economic determinants of pollution or due to the dispersion of pollutants.

Blurring the boundaries

People's everyday movements and social interactions are not always confined to a bounded geography and as such are extremely difficult to capture when using a pre-defined boundary, such as a ward, since this imposed boundary may be artificial and perhaps does not accurately reflect their everyday encounters. Therefore, whilst I am limited to using delineated geographic boundaries for the statistical data techniques as described below, I was aware that in the case-study element of the research I needed to be more conscious of this difficulty, and as a result I asked residents where they accessed services and whether or not these fell within the ward boundary. I mention this point here as it relates to spatial autocorrelation to a certain extent since neighbouring areas will share similar characteristics with proximal areas.

Statistical approach: Regression Tree Classification

Regression Tree Classification (RTC), part of decision tree methods and known as 'recursive partitioning' (Lemon *et al*., 2003, p.172), was chosen as the statistical technique for this study as it is able to work with the concept of outliers. This is central to the research inquiry as the first research aim is to find a way to be able to identify economically deprived areas in England, and more specifically in NEE, that are shown to defy the odds and go on to

achieve relatively good health outcomes compared to areas with similar levels of deprivation.

RTC is able to identify such areas by dividing them into meaningful sub-groups. Within these sub-groups, areas are then able to be identified as outliers (either doing better or worse than might be expected given levels of deprivation). This method works by starting with a root node and then recursively splitting the data into child nodes. The idea is to find nodes with minimal within-variance, thus the most homogeneous groups. To identify areas with low deprivation but poor health, the standardised residual from the regression tree greater than 1.96 can be used to focus on the groups with the least deprivation and good health (not 'resilient'). To identify areas with high deprivation but good health ('resilient'), the standardised residuals less than -1.96 can be used to focus on the most deprived group with poor health.

RTC is in principle very similar to multiple regression analysis except that it does not enforce a linear relationship between the dependent and the predictor variables as it is a nonparametric statistical test. This is important as most of the health indicators that I have used in the study show a strong and linear relationship with deprivation (as deprivation increases so do number of premature deaths and so on); however, there are some outliers (the ones that I am most interested in) see Figure 3.3.

Figure 3.3: Scatter plot for premature mortality and deprivation

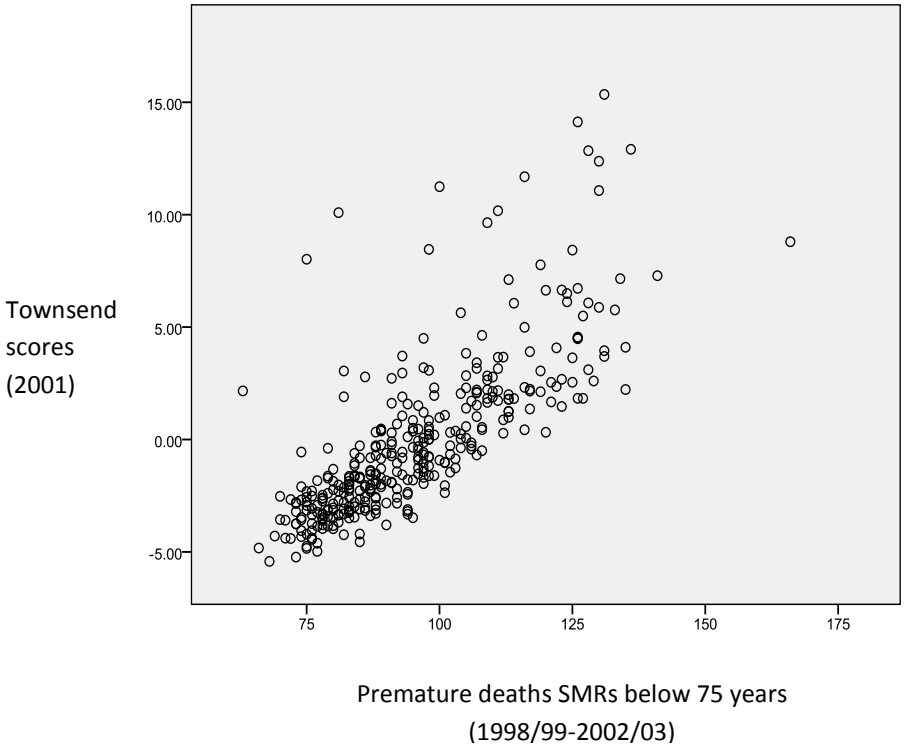


Figure 3.3 displays how premature deaths are strongly correlated with deprivation at Local Authority level (as deprivation increases so does the SMR for premature deaths). This figure shows that for premature deaths there are some outliers, which is exactly what is important to this thesis. Although scatter plots are only shown for 2001 deprivation data, the correlations almost mirror the above plots for previous years (1971, 1981 and 1991) and this is the same at different geographic scales (CASWARDs and LSOAs).

The analysis was conducted in the statistical software package called *R.* This package was downloaded from The R Project for Statistical Computing and is available at http://www.r-project.org/. Appendix 1 provides a step by step description of each stage involved in the analysis alongside syntax used at each step.

Further exploratory statistical analysis

Factor analysis

Factor analysis is a statistical method that has a long pedigree in human geography dating back to the 1960s (Clark *et al*., 1974). This method has also been widely used in the fields of health geography and increasingly in public health. Factor analysis is an umbrella term to encompass all factor analysis applications. In this research I use the Principle Components Analysis (PCA) method to extract factors, which is the most commonly used technique. PCA is principally used when there are no a priori expectations about how many factors exist within the data under study.

Typically factor analysis has been used in health geography and public health research to develop typologies, for example when trying to identify socio-economic indices (Krieger *et al*., 2003; Vyas and Kumaranayake, 2006). Factor analysis is a multi-variate technique that has two main uses: (1) It helps with data reduction by reducing a large number of variables into a smaller set known as 'factors' through factor loadings; and, (2) it can identify underlying structures among the data, which allows for the refinement of theory (Williams *et al*., 2010). It is therefore useful for exploring complex relationships, such as the relationship between health and place examined in this thesis.

Multiple correspondence analysis

Some previous studies (Gatrell *et al*., 2004; Veenstra, 2007; Cairns *et al*., 2012) have examined neighbourhoods and place effects on health and inequalities have used a technique called Multiple Correspondence Analysis (MCA). MCA is sociological in nature, originally developed by sociologist

Pierre Bourdieu in the 1980s to detect underlying structures in complex social datasets. MCA is part of a range of descriptive methods (such as factor and cluster analysis) and an extension of simple correspondence analysis to allow examination of multiple variables. Conceptually, MCA is similar to factor analysis; however, it works with categorical data.

The MCA technique is useful as it constructs a visual diagram that represents social space and is able to map out determinants of health onto this space. It also helps us to unpack complex relationships (e.g. between place and health) more simply by revealing underlying relationships in complex datasets. The principal normalisation method was used in this analysis.

Logistic regression

Logistical regression is a type of regression analysis, which measures the relationship between dependent and independent variables. It is a method used when working with dichotomous categorical dependent variables (resilient/not resilient). It tries to predict the outcome of the dependent variable based on the predictor (independent variables). It has been commonly used in health research, mainly epidemiological studies (for example Larsen and Merlo, 2005).

Table 3.6: Data sources for predictor variables

Predictor variables	Source/Geography	Definition
Social Capital and Place Attachment		
Social Fragmentation Index	UK Census (2001)/LAD & CASWARD	Consists of four census variables: % non-married adults, % single person households, %population turnover and % private renting
Crime Domain	IMD[7] (2004)/ LAD, CASWARD & LSOA	Measures the rate of recorded crime for four key dimensions of crime. These are burglary, theft, criminal damage and violence.
Natural Environment		
Domestic gardens	GLUD[8] (2001)/ LAD, CASWARD & LSOA downloaded from Neighbourhood Statistics	Domestic gardens coverage. Area (in thousands of metres squared) of 'Domestic Gardens' in the administrative area.
Green space	GLUD (2001) downloaded from Neighbourhood Statistics/ LAD, CASWARD & LSOA	Green space coverage. Area (in thousands of metres squared) of 'Green space' in the administrative area.
Water	GLUD (2001) downloaded from Neighbourhood Statistics/ LAD, CASWARD & LSOA	Water coverage. Area (in thousands of metres squared) of 'Water' (surface) in the administrative area.
Living Environment Domain	IMD (2004)/ LAD, CASWARD & LSOA	Consists of two sub-domains: the 'indoors' living environment which measures the quality of housing and the 'outdoors' living environment which includes measures of air quality and road traffic accidents.
Settlement Type (Urban/Rural Classification)	Office for National Statistics (2004)/ LAD, CASWARD & LSOA	Defines the urbanity/rurality of different geographies. LADs are classified using a sixfold grouping: *major urban; large urban; other urban; significant rural; rural-50; rural-80*. Small geographies (e.g. CASWARDS/LSOAs) are classified using a threefold grouping: *urban; town & fringe; village, hamlet or dispersed.*

[7] Index of Multiple Deprivation (IMD). Data downloadable from: www.communities.gov.uk
[8] Generalised Land Use Database (GLUD). Data obtained from Neighbourhood Statistics: www.neighbourhood.statistics.gov.uk

Table 3.6 lists the area variables that were included in all three analyses - all of which were proxy indicators of place attachment, social capital and natural environments as these emerged as significant findings from the case study. All statistical techniques were carried out in SPSS version 17.0. Different spatial scales are considered: LAD, CASWARD & LSOA. However, Logistic Regression was limited to CASWARDs only due to the small number of 'health resilient' areas identified at LAD and LSOA level. The indicators that were used in the analyses are further described below for conceptual clarity.

Social capital and place attachment indicators

Social Fragmentation (Anomie)

Emile Durkheim was one of the first scholars to recognise the importance of social support and integration for health and well-being in his well-known study conducted in 1897, which discovered that societies with a high level of social integration had greater immunity to suicide compared with those societies that were less integrated and have greater 'anomie' (Durkheim, 1952).

Peter Congdon (1996) created an index of 'Social Fragmentation', otherwise known as an 'anomie' score, which was originally used in his attempt to explain suicidal and parasuicidal attempts in wards throughout London. Congdon (1996) simultaneously examined economic deprivation and social fragmentation, to find out which one had a greater association with suicide and parasuicide (defined as an attempt at suicide in which the aim is not death but is a predictor of subsequent suicidal attempts). He discovered that female suicide was most influenced by anomie, whereas male parasuicide

was more strongly influenced by economic deprivation. Whitley *et al.* (1999) also used this anomie score in their study. They found that suicide rates were more strongly associated with increases in social fragmentation than poverty at parliamentary constituency level.

Moreover, Fagg *et al.* (2008) found that social fragmentation, based on Congdon's index described, was independently associated with mental distress. Lastly, Sjarne *et al.* (2004) studied the effects of social fragmentation on physical morbidity. Thus, social fragmentation has been found to be associated with both physical and mental health. Therefore, it is believed that this will likewise be associated with the health indicators used in this thesis.

The social fragmentation index consists of census variables on percentage of non-married adults, single person households, population turnover and private renting. These variables are used to signify high levels of residential instability and social isolation. Social fragmentation is conceptualised in this thesis according to Fagg *et al*.'s definition: 'a lack of social integration and social cohesion [which] implies that aspects of social capital, such as reinforcement of social norms, trust and reciprocity, may be more difficult to maintain' (2008, p. 243). Social fragmentation is used in this research as an inverse measure of social capital at the area-level.

Crime

Crime has also previously been used as an inverse indicator of social capital (Wilkinson *et al.,* 1999) with higher crime rates predicting lower social capital and vice versa. Lochner *et al.* (1999) suggests that this association between

crime and low social capital may be explained through the social disorganisation theory (Sampson, 1996). This theory postulates that the ability of a neighbourhood to control crime depends on the level of informal social control and the willingness of local residents to intervene.

The crime indicator used in this analysis was obtained from the Indices of Multiple Deprivation (IMD, 2004). One of the sub-domains is crime, which is measured by four different types of recorded crimes: burglary, theft, criminal damage and violence.

Natural environment indicators

Domestic gardens

Allotments and gardening featured as important (traditionally and contemporarily) in the case study area. This measure is derived from the Generalised Land Use Database (GLUD). It only measures domestic gardens and not allotments. It is a comprehensive overview of capacity for gardening as it measures how much garden space there is in an area. Of course, this measure does not tell us whether or not residents actually use the garden space, and if they find it beneficial for their health or well-being. Nonetheless, it provides a good indication of the availability of garden space and therefore the potential for gardening to be important in a locality.

Green space

Many studies have found a strong association between green space and health. Studies have hypothesised a positive, salutogenic, association between green spaces and a wide range of health benefits, including being linked to better self-reported health, reduced stress and obesity, lower blood

pressure, and lower all cause and circulatory mortality Richardson and Mitchell (2010). Empirically, it has been shown that green spaces are protective from the risk of mortality and self-reported morbidity (Richardson *et al*., 2011). Researchers have attributed this positive influence of green space on health to the restorative effects of nature (both psychologically and physiologically). This links into the therapeutic landscapes concept , biophilia and ART (discussed in ***Chapter 2***) and how particular natural landscapes may be both restorative and therapeutic. It is hypothesised that areas with greater levels of green space will be amongst the more 'health resilient' areas due to the strong associations found by previous studies, particularly the ones that examined self-reported health and all-cause mortality as these are the indicators examined in this thesis.

Data on green space is supplied by the GLUD, which was obtained from the Neighbourhood statistics website. It is measured by area of green space in square metres (excluding domestic gardens). It must be noted that although this data provides comprehensive data on quantity of green space it is limited in that this does not assess the quality of these spaces. If they are not conducive to exercising or attractive to residents then this may result in their not being used. However, this data is still indicative of areas that have more exposure to green spaces even though it does not tell us whether or not they are well-used.

Table 3.7: Examples of research in environmental psychology on waterscapes - Curtis (2010) p.52

Author	**Study Design**	**Findings**
Moser (1984)	85 interviews with holiday makers in France	Water quality judged in terms of debris; colour; odour and water plants.
Herzog (1985)	250 psychology students, USA	Preference was for spaciousness, coherence and mystery and for mountain lakes and streams.
Herzog (1992)	341 undergraduate students, USA	Large bodies of water were seen as more tranquil but rushing water was more likely to be preferred.
Hetherington *et al.* 91993)	339 university students, USA	Respondents preferred scenes with faster flowing water which were accompanied by sound.
Wilson et al. (1995)	105 people from university community, Canada	Respondents preferred scenes showing canoeists and a goose. These were preferred for recreational activity. They disliked scenes with a floating tyre, aquatic vegetation; surface foam; a health warning sign; an industrial backdrop.

Water

In addition to ‘green’ spaces for the promotion of public health, ‘blue’ spaces (encompassing lakes, rivers, sea) are also being realised for their restorative health effects and both fall under natural capital framework, which was discussed in ***Chapter 2***. Initiatives for green and blue space adaptation in urban areas are becoming increasingly common. It is believed that exposure to waterscapes as well as other natural settings will have a beneficial

influence on health. Curtis (2010) traces some of the studies that have been conducted by environmental psychologists to analyse the satisfying and restorative effects of waterscapes (see table 3.7). Places that are found to be rich in natural capital may also be among the most 'health resilient'. The measure of water surface area is also taken from GLUD.

Living environment

Living environment is another sub-domain of the IMD (2004). It consists of two measures: quality of 'indoor' and 'outdoor' living environments. Indoor living environment was measured by quality of housing. Outdoor living environment was measured by air quality and number of road traffic accidents. This measure provides a good indication of level of environmental deprivation in an area and is therefore thought to be related to the health outcomes, with the expectation that areas with higher living environmental deprivation will have poorer health and vice versa.

Urban-Rural Classification ('Settlement Type')

The Department for Environment, Food and Rural Affairs (DEFRA) developed a typology of areas. DEFRA's sixfold classification was used to classify LADs into urban or rural:

(1) Major Urban

(2) Large Urban

(3) Other Urban

(4) Significant Rural

(5) Rural – 50

(6) Rural – 80

DEFRA's (2009) introductory guide entitled *Defra Classification of Local Authority Districts and Unitary Authority in England* describes how it defines each of these groupings. Firstly, a set of 'major' and 'large' urban areas are distinguished by having a population over 750,000 people and between 250,000 and 750,000 people respectively. Secondly, a set of districts that have the majority of their populations living in rural settlements (over 50%) are considered to be 'predominantly rural'. Thirdly, a set of districts where the population includes a mix of urban and rural that can be further differentiated according to whether they have a 'significant' amount of rural population, which are referred to as 'other' urban and 'mixed urban/rural' districts.

The morphologies used to describe CASWARDs and smaller geographies (Super Output Areas) are different as very few were characterised by predominantly dispersed settlement (for example only 0.5 % of wards) (Bibby and Shepherd, 2004). For this reason, only three morphological categories were distinguished at this scale:

(1) Urban

(2) Small town and fringe

(3) Village, hamlet and isolated dwellings

Case study

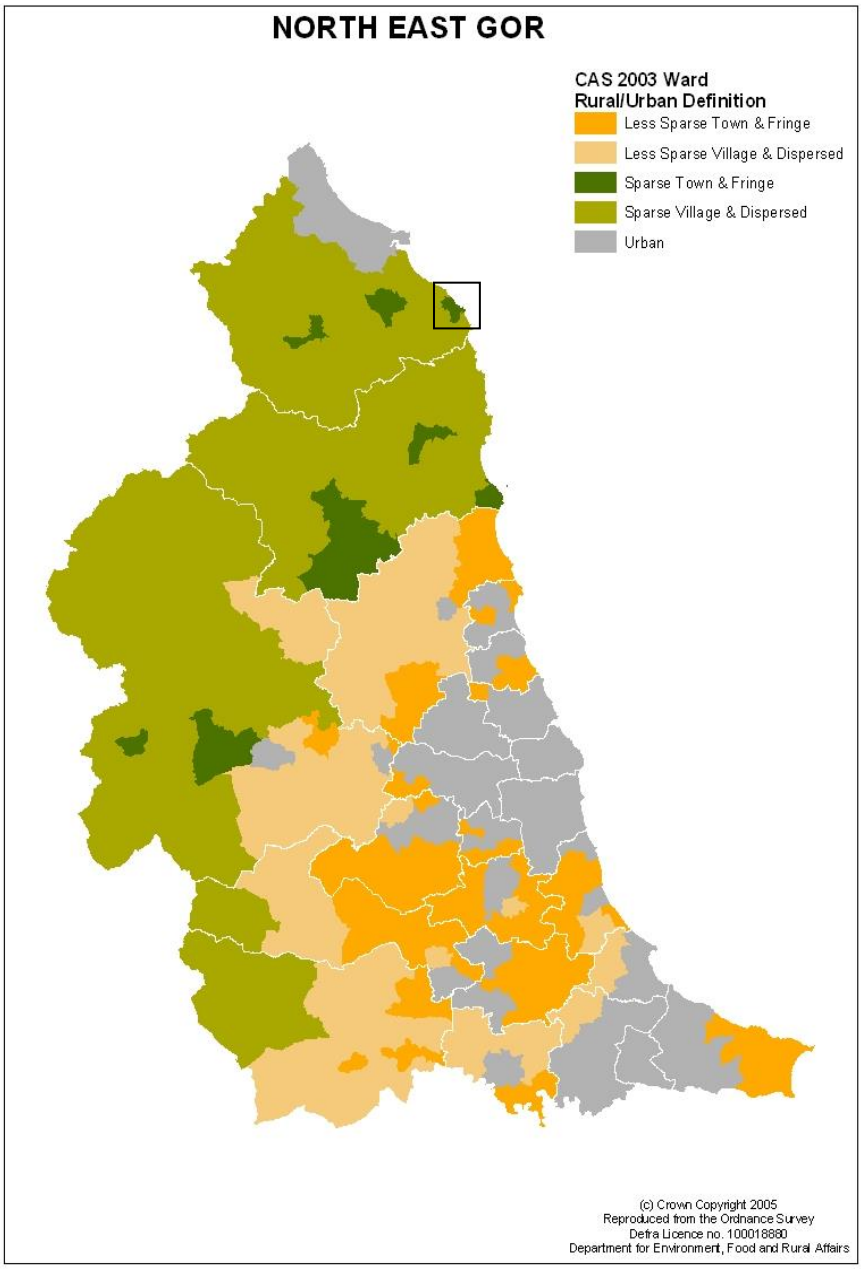
Context

The selection of the case study area was informed by the statistical analysis findings. This site that was chosen was found to be a statistically significant outlier in the RTC analysis that was previously discussed. This area overachieved in two health outcomes (self-reported limiting long-term illness

(SMR = 101) and premature deaths (SMR = 106) compared to its economic peers in the same group). In persistently economically deprived CASWARDs, the group average for limiting long-term illness was SMR = 131 and premature deaths was SMR = 141.8. Whilst it did not overachieve in self-reported not good health, it still had a relatively low SMR in this health outcome (SMR = 109) compared to its economic peers (average SMR = 162.39) in the same group; however, it was not statistically significant. The case study area is classified as a sparse town and fringe (semi-rural) according to the Rural and Urban Classification 2004 by the Department for Environment, Food and Rural Affairs (DEFRA) – Figure 3.4.

DEFRA classifies areas according to two measurements: settlement form and sparcity (DEFRA, 2004). Settlement form refers to the type of settlement that is associated with each hectare grid square. The sparcity refers to the score denoted to each hectare grid square based on the number of surrounding households (up to 30km distance surrounding the hectare squares).

Figure 3.4: Map of North East England (Rural/urban breakdown)



The case study site is based in what was previously known as the Castle Morpeth Local Authority located in Northumberland in the North East England (NEE). The field site is characterised by high levels of unemployment and social housing. Since it is a former coal-mining area, de-industrialisation has meant that unemployment has been rife since the 1960's and 1970's (since the closure of surrounding mining collieries in and around the locality). Within the ward boundary, as it was delineated in 2001, there are four villages that

make up the social fabric of the ward: Red Row, Broomhill (North & South) and Hadston. These four villages all have varying degrees of unemployment and social housing.

Negotiating access

Recruiting research participants does not come without its difficulties, especially when trying to conduct research in tight-knit communities (Sixsmith *et al*., 2003) such as the study area in this research. Researchers have suggested different types of recruitment strategies to aid with this process, including advertising, making contact with community organisations or agencies, and recruiting through existing organisations or via informal networks of colleagues (MacDougall and Fudge, 2001).

Advertising was the first strategy that I adopted in this research. Flyers and posters were distributed and placed in local shop notice boards and community centres. However, this approach was not successful in recruiting local residents. Rather gaining access to research participants was mainly achieved through establishing key contacts in community organisations that have an interest in the local community. These stakeholders included leaders within two local community centres, a Church that serves the local area, and a Sure Start centre. Forming a relationship was an important first step. Once the centres got to know more about myself and the research I was conducting they steered me in the right direction and suggested groups that regularly meet in the centres that might be interested in taking part. They essentially became champions of the research and their support of the

research was integral to the success of the project. Subsequently, recruitment was done via snowballing.

The snowballing sampling technique that was used was implemented in a purposive way as I sought to recruit local residents of varying ages, some residents who have lived in the area most or all of their lives, some residents who moved out of the area and equally those who have moved into the area. The purpose of this was to gain a richer understanding of the impacts of the local area on different demographics and how the local area may have impacted on decisions to move into or out of the neighbourhood. Davey Smith *et al*.'s (1998) study found that quality of life factors influenced migratory decisions such as availability and quality of amenities, services, housing and notions of community. Thus having a balance of respondents who have lived in the area all of their lives as well as those who have moved into the area would allow me to gain an understanding of area characteristics that have influenced their decision. Age was also deemed to be an important factor as older long-term residents would have lived through changes that accompanied the transition from coalfield area to the decline in industry, and experienced the impacts this may have had on the local community. I therefore felt it was important to talk with a range of age groups to be able to capture such industrial and social transitions.

A final technique that was used to recruit participants came out of the research itself. Whilst I was in the field I discovered that there was a local history group set up by local residents on a social networking site. A local resident informed me of this group once he knew I had an interest in the local history of the area and encouraged me to join this forum. By contacting the

administrator of this group with an outline of the research project I was granted permission to advertise my research on the group page and this generated positive responses and led to the successful recruitment of several individuals.

Therefore, recruitment manifested in a number of ways during this study. The process of recruitment was fluid and largely came out of actually being in the field and through dialogue with local residents themselves. Sixsmith *et al*. (2003) discuss how it 'became evident that obtaining a sample was not simply a matter of recruiting people into the research but, rather, a complex social process of gaining access into the community itself' (p.579) and this certainly resonates with my own experiences of recruitment. I had to integrate myself and gain trust in the community to be able to conduct the research; it was a continual process of negotiation.

Qualitative research methods

A range of qualitative methods were deployed as part of this case study research including focus groups, semi-structured interviews, informal conversations and observation. The research was undertaken over an intensive six-month period, between May and October 2011. These various research methods and the decision to use them will now each be discussed in turn.

Focus groups

The term 'focus' group is questioned here as the discussions were semi-structured in that I had a topic schedule (Appendix 2); however, I also wanted themes to emerge more inductively from the discussions and not to make it

too imposed or top-down. Therefore, the discussions were 'focused' to a certain extent but also open. I therefore prefer to use the term 'semi-focused' focus groups.

Pertinent to this method are the group dynamics and interactions that take place amongst the participants. Focus groups have been widely used in health research and human geography. Kitzenger (1995) argues that focus groups, unlike any other type of qualitative data collection, can reach into parts of understanding that are often 'untapped' through group interaction and conversations reflecting everyday forms of communication. She states that these more everyday forms of communication may tell us more about what people know or experience than perhaps more 'artificial' types of conversation that interviews may create. In the same vein, Wilkinson (1998) argues that focus groups enable researchers to listen to participants' own language and concepts through their everyday conversations. An understanding of the habitual language used by participants will be vital to making sense of their accounts. It can almost be viewed as a listening exercise, one in which the researcher can become familiar and not impose their own language onto the participants. They also come with many other qualities such as encouraging participation and contribution from those who may be less willing if interviewed individually. They also have the potential to uncover sub-cultural values and group norms. It was believed that these group discussions would provide me with an understanding of shared concerns or issues related to local services, facilities and amenities. Through agreement or disagreement I would be able to gauge whether or not issues raised were collective concerns and thus areas into which I should look

further. Longhurst (2003) argues that focus groups are especially useful for accessing several viewpoints and exploring interactions between participants. Therefore, there are many advantages of group discussions that would be of benefit to this research.

On the other hand, some limitations of focus groups may be that, due to the nature of group dynamics, some voices may be silenced by the more dominant participants in the room. Also, if discussing potentially sensitive issues then individuals may be less inclined to discuss in such a group setting. Therefore, depending on the topic area they may not be the most appropriate method to use. In terms of this study, however, they were felt to be useful for the following reasons:

- Topics or issues that were agreed to be important by most group members could be used to generate questions to ask in the interviews.
- They provided a 'way in' to shared knowledge and experience that I might not otherwise have received through interviews alone.
- The subject area that I was exploring was not sensitive in nature.

Therefore, for the reasons outlined above, focus groups were deemed to be useful and appropriate research tools to access the type of knowledge that I was interested in exploring.

The focus group meetings took place in different local settings according to the research participants. One took place in the local community centre, one in the local Church hall, and one in a family home. These settings were all conducive to group interaction and comfort, since the physical constraints of

a setting can certainly impact on levels of responsiveness. In fact, having the focus groups among individuals who already knew each other (either through pre-existing groups or being part of a family) immediately helped to nurture open and honest dialogue.

Interviews

Semi-structured interviews were also conducted with individuals (Appendix 3 with interview schedule). In some cases, joint interviews were also conducted (for partners/spouses/friends). Some questions were already pre-established and an interview topic guide was drafted. However, as with the focus groups, I wanted the discussion to emerge from the individuals so the questions were open-ended and I let the discussion constructed in the interview steer the way. The interviews took place in different settings: neutral spaces (e.g. local community centre and church); individuals' homes; and online (via Skype) as requested by some individuals due to their different lifestyles.

The purpose of conducting interviews in this study was to elicit an in-depth understanding of the experiences and viewpoints of local residents in the case study area. As previously discussed, building rapport and establishing trust with participants was paramount to the success of the interview (Denzin and Lincoln, 2005), which is discussed in more detail shortly.

Informal conversations

As part of the research process there were several serendipitous encounters that also took place in the community centres, which led to informal conversations. These conversations were unscheduled and not recorded. Nonetheless, they were important as they alluded to issues which I had not

considered and were subsequently of great significance to the research. They are therefore recognised as important, though unexpected, elements of the research which warrant acknowledgement. They also impacted on the interview and focus group schedules as I included questions based around the content of these more informal conversations.

Observation

Finally, I observed the local surroundings in several ways. Firstly, I conducted walking ethnographies of the local area and observed the resources, amenities, infrastructure and so forth. I also attended local meetings including the neighbourhood 'Beat' meeting, the community centre's service user meeting, informal drop-in sessions at the Sure Start centre, and the local Parish Council committee meeting. Observations made by myself during all of these occasions were also significant and field notes were taken to capture my thought processes at the time.

Research participants

In total, 33 research participants took part in the research. Table 3.8 shows the demographic characteristics and the total number of research participants who took part in the focus groups and interviews. The table shows that a total of 34 participants took part in the research; however, one individual took part in both an interview and a focus group, so there were 33 participants overall.

Table 3.8: Sample size and demographic composition of research participants

	Focus Groups (n=3)		***Semi-structured interviews (n=15)***	
Sex	***Number***	***Mean Age***	***Number***	***Mean Age***
Male	3	66	10	50
Female	13	67	8	53

Analysis using Nvivo

Permission was granted by all research participants to record the focus group and interview conversations and these recordings were transcribed verbatim by myself over a period of two months throughout October and November 2011. Interviews ranged from 25 minutes to 1.5 hours. Focus groups ranged from 50 minutes to 2 hours. Thematic coding took place using a qualitative software package, Nvivo (Version 8). Data from focus groups and interviews were first thematically coded using broad categories generated by 'free nodes' in Nvivo before synthesising these into overarching 'tree nodes'.

Thematic analysis: identification of themes

Thematic analysis involves the identification of themes that emerge from data as being important to the phenomenon under study. The analysis was partly data-driven (inductive) and partly *a priori* theory-driven (deductive). On the whole, I sought to generate themes that emerged from the interviews and focus groups, yet I had some *a priori* theories about what I expected to find in the research so this will have influenced the way in which I categorised the themes in relation to theories relevant to the study. As already mentioned, coding took place in Nvivo by firstly producing broad themes using free

nodes and then overarching themes with the aid of tree nodes. The process of coding was iterative in nature. Iteration occurred in terms of analysing interview and focus group scripts and identifying key words/phrases and producing relevant themes and then repeatedly going back through scripts to see if any other data fit into these thematic categories. Many of the initial categories overlapped and so some of the themes were grouped to create overarching thematic categories.

Doing research: reflections from the field

In the following section I would like to take some time to discuss some of my reflections that emerged during the research process. These reflections are centred around issues of power, relationship-building, ethics, positionality and reflexivity.

Issues of power in the research

Power dynamics are inherent in any type of social research inquiry. This first became apparent when I was in the field conducting interviews and leading focus groups, and sometimes in informal conversations at the local community centre. Many residents did not recognise that what they had to say was valuable to the research. I would often get responses such as *"I don't really have much to say"* or *"I don't think what I have to say is important or helpful"*. Their devaluation of their experiences and opinions made me think about issues of power, and how some of the participants would not have any confidence in what they had to say and their own experiences. This made me question whether or not I had an influence on this, how I was perhaps perceived as an 'expert', and whether this may have contributed to

their hesitation in opening up to me and in recounting their experiences. I did find that many of these practices were diluted as I got to know members of the community more and in a way I became more established as a researcher with a genuine interest in the locality and the residents.

Relationship-building: researcher-researched relationships

Relationship-building in qualitative research is integral to the success of the research. This is partly due to the power barriers that I have already described above. Hewitt (2007) discusses how we should strive to form ethical research relationships. 'Researcher-researched' relationships should be as non-hierarchical as possible and the use of rapport building is able to help with this process.

I had to negotiate my 'way in' to the community and earn their trust before I became accepted and known to the local people. This relationship-building happened over a period of months and I found that the more I tried to integrate myself into community events, such as attending community centre user meetings, the local monthly beat meetings, and the Parish council meetings, the more I was laying the foundations for relationships to form and to get myself established in the local area.

Ethical considerations

As with any research, there were ethical considerations to take into account. These typically comprise consent and confidentiality. Written informed consent was gained from research participants who took part in the research. All participants were provided with a detailed participant information sheet and consent form (Appendices 4 and 5). The participant information sheet

outlined what the research was about and what taking part in the research would involve. They were required to read this prior to signing the consent form. Participants were also informed that they would remain anonymous in any publication that would result from the research. As such, participants' names have been changed and pseudonyms are used in the following empirical chapters. The above ethical procedures are common practice in any type of research. There were, however, more specific ethical considerations that I had to consider for this doctoral research and these are outlined below.

Describing an area as 'deprived'

Due to the research being interested in exploring economic deprivation and its impact on population health outcomes, I had to be careful when I used the terms 'deprived' or 'deprivation'. I was not sure how research participants might react to their area being labelled in such a way. After all, did they even perceive their area as being 'deprived'? This was a real challenge. I referred to the indices I used to measure deprivation to try to explain this in a way that would not cause any offence or indeed confusion. As it transpired, this was never actually an issue in the field as not once did any participant comment on this or perceive the way I described the area any differently. Therefore, it was more of an ethical concern for myself, which did not translate into the field. However, I did feel that it made me more critical of how I used the term and what the measurement might actually mean on the ground. After all, there is more than one way of trying to capture deprivation and the Townsend measure is just one way. More specifically, I was interested in capturing economic deprivation as opposed to other forms of deprivation so I

realised that, by being more critical about my measurement and application of the deprivation measure I was using to describe my case study area, I have become a bit more cautious of the terminology I was using in the research.

The 'self' in research: positionality & reflexivity

What is the 'self' made up of? Nunkoosing (2005) states that 'Health researchers who use interviews cannot pretend that their status, race, culture and gender and their interviewee's status, race, culture, and gender do not influence what can be said, how it is said, and what can be written about' (p.704). Certainly, I cannot pretend that my own positionality did not have any bearing on the research and certainly on research participants. By positionality I mean two things: firstly, how my 'position' (as a privileged, educated doctoral research student) and how this position generates a 'politics of knowledge' - that is how I have the power to impose my interpretation onto my research (Rose, 1997). But how do we as researchers know what effect, if any, our presence and positionality has on research participants and their responses, or on the way in which we interpret our research findings? This is a question which I will ultimately fail to answer as I simply do not know what the answer is. However, I attempt to unpack these issues further below.

Hewitt (2007) talks of the inherent subjectivity involved in qualitative research:

> To understand how reality is constructed and interpreted, the researcher's inherent subjectivities, including values, beliefs, and

> emotions should be accepted as centrally involved in the research process, and the notion of objectivity rejected as neither necessary… (p.1149)

Hewitt argues for the need to be reflexive when conducting qualitative research as this promotes rigour. She states that 'reflexivity is necessary for researchers to critically examine their own priori assumptions and actions through being self-conscious and self aware' (p.1155).

McLaren (2009) likewise calls for a reflexive engagement with research, and part of this involves an analysis of the 'self'. In the following field note I document my first day arriving at the case study area and my thought processes and observations, which will help to shed some light on some of my presumptions and my positionality and the impact this might have had on the research.

May 2011

As I drove into the area I noticed I got a few looks from local residents. I don't know if it was just me feeling suspicious (as a researcher and an outsider) or if I genuinely got some stares. This may have been because no-one knew me. I remember trying to find a place to park my car and whilst I drove round I noticed that there were quite a few young people (around 14-15 years old) congregating outside the local newsagent and fast food shop. I wondered why they were there during the day and then it dawned on me that it was the school half term.

As I surfaced from my car I had a camera, rucksack and notebook and was extremely paranoid and anxious. Paranoid about what residents might think of me as a researcher and anxious that they would be suspicious of my motives. I don't know where any of this paranoia or anxiety had come from. It was the first time being out in the 'field' so this may have played a role. I had been so used to examining areas from a distance, behind a desk. I had the security of that distance. Now, I was out in the area, knew no-body, and was apprehensive about where to start, and indeed what to do first.

As I walked round the area, I tucked my camera away (out of sight). Partly to avoid looks from what I perceived to be suspicious residents but partly because I just didn't know how safe the area was, and whether or not it was careless of me to have valuables on display. I wondered what they thought of me and my intentions with the camera in one hand and a notebook and map in the other. I had the feeling that they might perceive me as a journalist (or someone equally distrusted).

One notable incident happened as I was walking through the fields (passed the local park) and up through one of the signposted public bridleways. I young man (in his early 20s) started to walk quite closely behind me and I was almost certain I was going to get mugged. I started to hasten the pace that I walked at and I started to dread what was going to happen next…

Then, the man walked past me and carried on with this journey. I felt so silly. I had conjured up this image of the young man in my mind and for some reason unbeknownst to me had perceived him to be a threat. After this, I

walked along the main roads (to feel more comfortable as I was in sight of cars and passers-by).

This ethnographic field note made me reflect on what I had experienced that day, and the underlying layers of meaning inherent in the description I gave of the residents I encountered and of my perceptions and feelings. I was completely shocked by my preconceived ideas that the neighbourhood might not be 'safe'. Then I came to the realisation that perhaps my wide reading around crime and safety in deprived neighbourhoods had shaped my judgemental thoughts. I was also conscious of my status as a relatively well-educated female in my mid-20s from the outskirts of London. Madge (1993) argues that it is essential to consider 'the role of the (multiple) "self", showing how a researcher's positionality (in terms of race, nationality, age, gender, social and economic status, sexuality) may influence the "data" collected' (p.193). Being self-conscious throughout the research process is stated to be what underpins reflexive positionality (Katz, 1992; Moss, 1995; Rose, 1997).

I was undoubtedly concerned about my positionality and how this may have influenced the research. Although I have lived in the North East for 7 years (just over 6 years at the time of conducting the fieldwork) I was not able to classify myself as a 'local' in the region. I felt that coming from a different context and the other side of the country may be a barrier to the research by preventing me from building up relationships with research participants. The more I considered how my 'self' and status might impinge on the research the more I made a conscious effort to be open about myself whilst talking with residents. I found that this reflexive engagement with the research has

had a positive influence on the research and the types of relationships that were formed with local residents and stakeholders in the area.

Chapter 4

Winners and Losers:

Identifying area-level 'health resilience' at different geographic scales

This chapter examines the national and local level results from the statistical data analysis that was outlined in the methodology section. As already discussed, England has huge variations in health and deprivation profiles (both regionally and sub-regionally) and the results in this section strengthen the need to further explore the nuances that exist in relation to these outcomes. Simply thinking about inequalities in health and deprivation in relation to a 'North-South' divide in England is misleading and unhelpful. Undeniably, poorer health is most concentrated in the North of England, whereas better health tends to be located towards the South of the country. Nonetheless, there is the risk that this divide is over-simplified as there are definite variations within regions in these outcomes as will be demonstrated in the findings presented in this chapter. The underlying argument of this chapter is that inequalities do not just manifest themselves *between* regions, inequalities also exist *within* regions, and as such it is pertinent that we consider better ways of identifying these differential outcomes and spatially varied experience of health and deprivation.

Whilst the relationship between high area-level deprivation and poor population health is well documented, as already mentioned there are a few

studies in England which have identified that nationally (at either local authority or parliamentary constituency level) some economically deprived areas actually go on to achieve relatively good health outcomes (Dolan *et al*., 2006; Tunstall *et al*., 2007; Cairns *et al.,* 2012). This demonstrates that there is a resistance to the detrimental health effects of deprivation with some areas performing better in terms of health than might be expected. However, the geographic scale at which this relationship is examined is of paramount importance, since local authorities and parliamentary constituencies are extremely large and heterogeneous geographic units and as such they may miss wide variations within these areas. This is one fundamental limitation of previous studies as they are unable to capture such variability in these health indicators by examining them at such large scales. Therefore, smaller units of analysis are also considered in this thesis in addition to examining Local Authority Districts (LADs): Census Area Statistic Wards (CASWARDs) and Lower Super Output Areas (LSOAs).

The underlying argument of this chapter is that it *is* possible to weaken the strong relationship between area-level economic deprivation and poor population health – it is not just an artefact, since this chapter has identified areas that have defied the odds and achieved relatively good health despite long-term economic deprivation. This chapter is divided into two main sections: national and local level results. The first section presents local authority and ward level results, which show that the geographic scale examined is significant to the results. The second section presents the lower super output area results.

National level results

Standardisation of the health indicators first took place prior to conducting any statistical analysis in order to take into account differences in age and sex structures in the populations considered at LAD and CASWARD level. The method of indirect standardisation that was used has already been outlined in ***Chapter 3***. The Standardised Morbidity/Mortality Ratios (SMRs) were mapped using a Geographical Information System software package, ArcGIS (Version 9.3). These SMRs in themselves provide a useful simple comparison of health outcomes between areas and enable the identification of general patterning of health outcomes. An SMR of 100 is in line with the national average in terms of health; an SMR below 100 is doing better than the national average; and an SMR above 100 is relatively worse than the national average. The three broad categories are first used in mapping the SMRs are as follows: an SMR=<100 (better than national average); an SMR=100 (same as national average); and an SMR=>100 (worse than national average).

Maps displaying SMRs for all three health outcomes at LAD level are shown in Figures 4.1 to 4.3 and maps displaying SMRs at CASWARD level are shown in Figures 4.4 to 4.6. Figures 4.1 to 4.3 clearly show a striking difference in areas performing well in health outcomes in the South of the country compared to the North (on the whole). This is no surprise as there is a wealth of research that has illustrated this North-South divide. However, what is perhaps more surprising is that there are some parts of the North that appear to be doing better than the national average in the health outcomes measured. Furthermore, when these maps are compared with Figures 4.4 to

4.6, it becomes clear that areas that are doing relatively worse in terms of morbidity and mortality are not confined to the North of the country. Figures 4.7 to 4.8 show that there where areas have worse morbidity and mortality deprivation tends to be higher and vice versa although there is some variability.

The limitation of such an approach that merely categorises health outcomes in this way is that it has the potential to overlook significant outliers in the 'better' or 'worse' categories, which is exactly what this research is most interested in uncovering. For instance, if an area has an SMR=66 (so doing extremely well relative to the national average), this area is presented in the same way as an area with an SMR=99 (so only just under the national average). The same will apply in the opposite direction for areas in the 'worse' category (SMR=>100). Therefore, further, and more sophisticated analysis is required to tease out these outliers. Thus, a statistical technique that is able to work with the concept of outliers is the preferred approach in order to have more nuanced findings.

Figure 4.1: Map of not good healthSMRs (LAD)

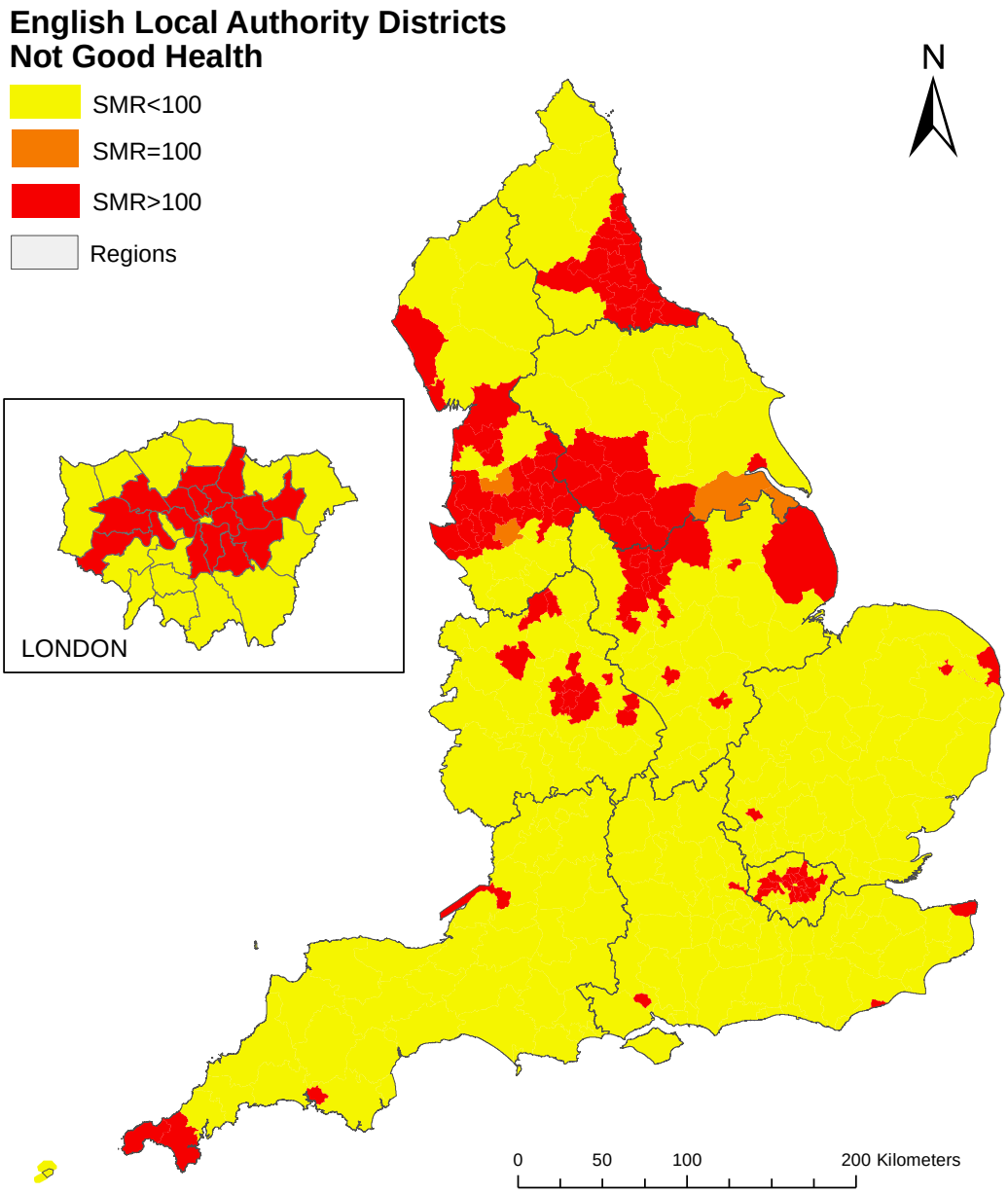


Figure 4.2: Map of limiting long-term illness SMRs (LAD)

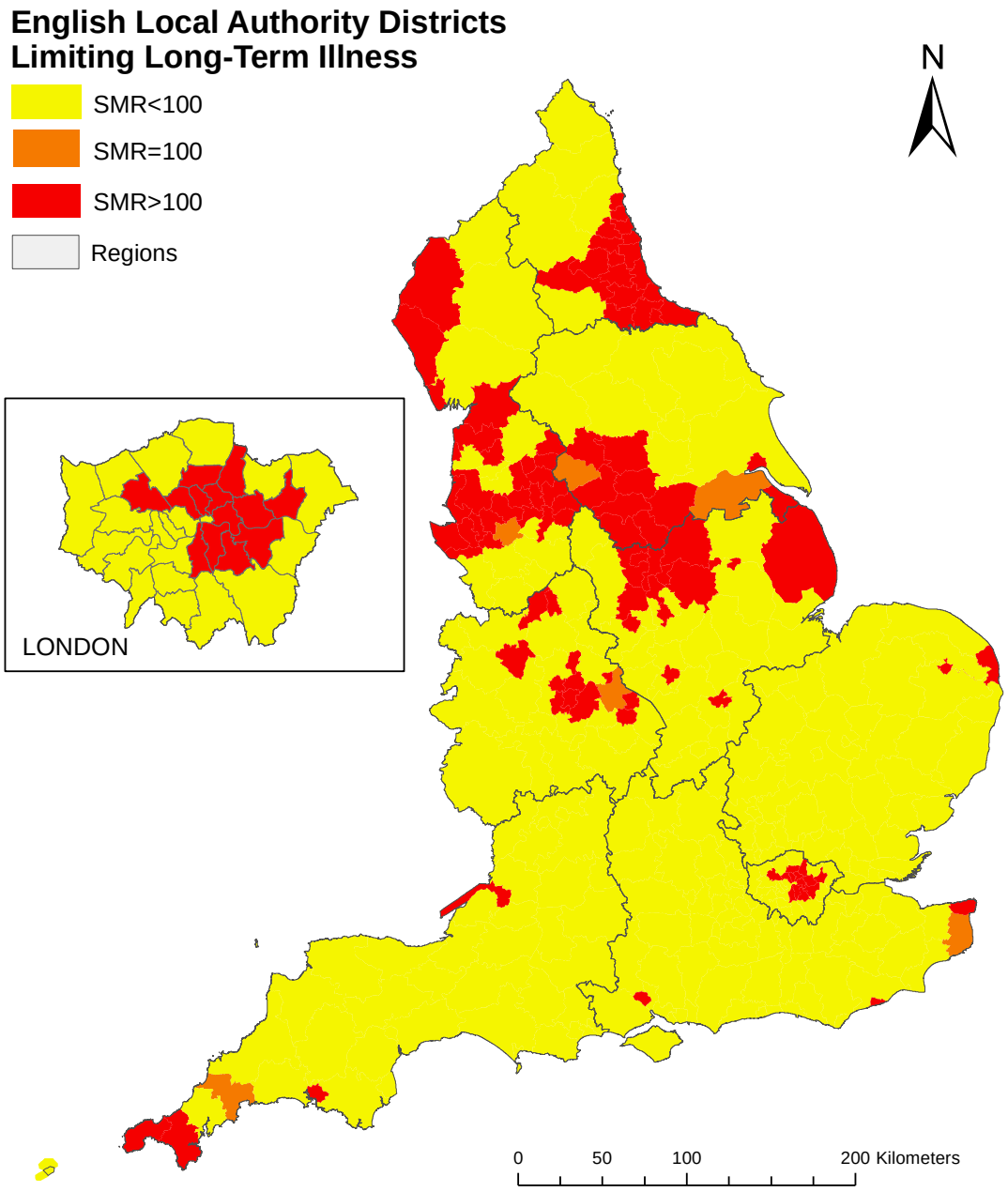


Figure 4.3: Map of premature deaths SMRs (LAD)

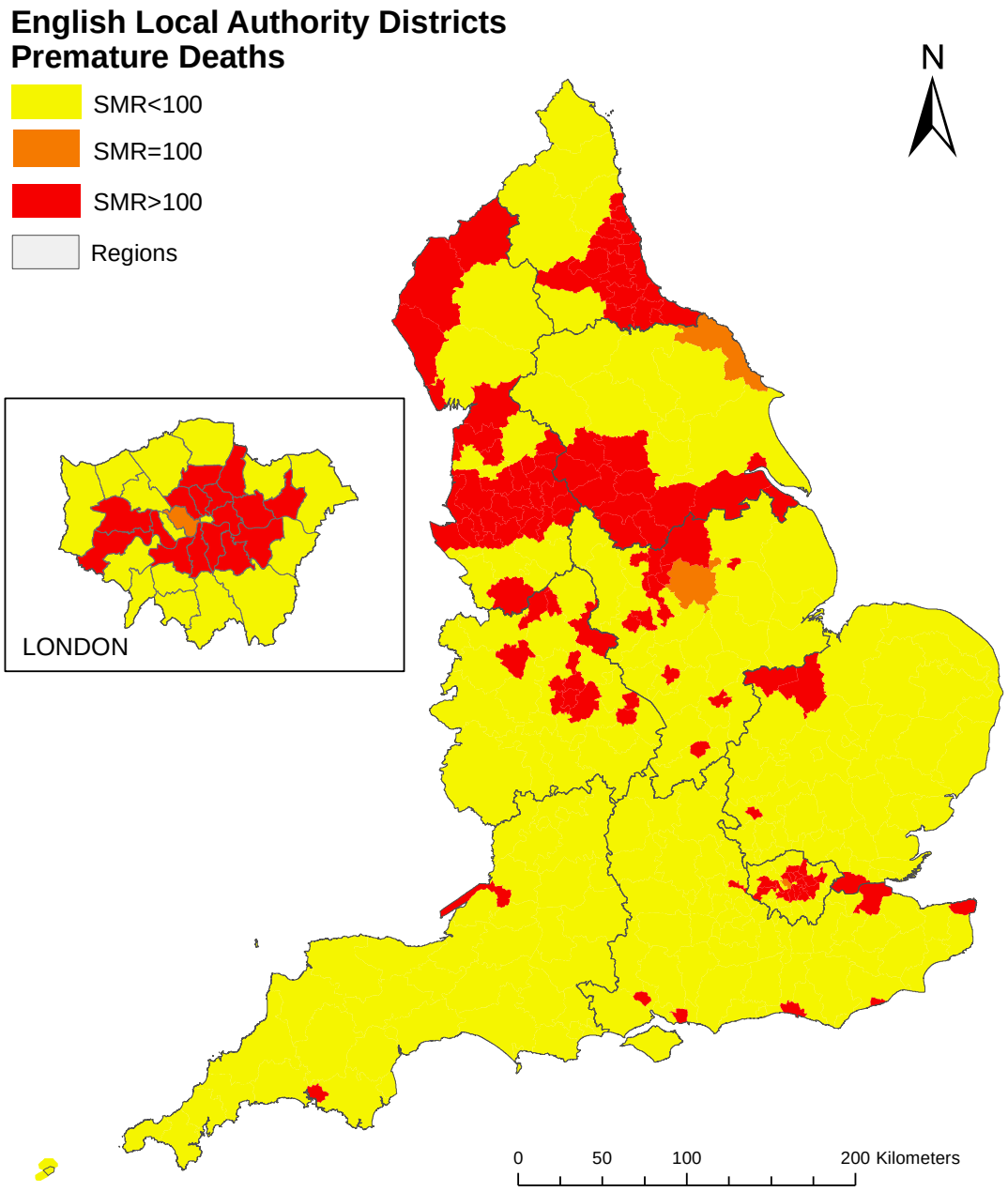


Figure 4.4: Map of not good healthSMRs (CASWARD)

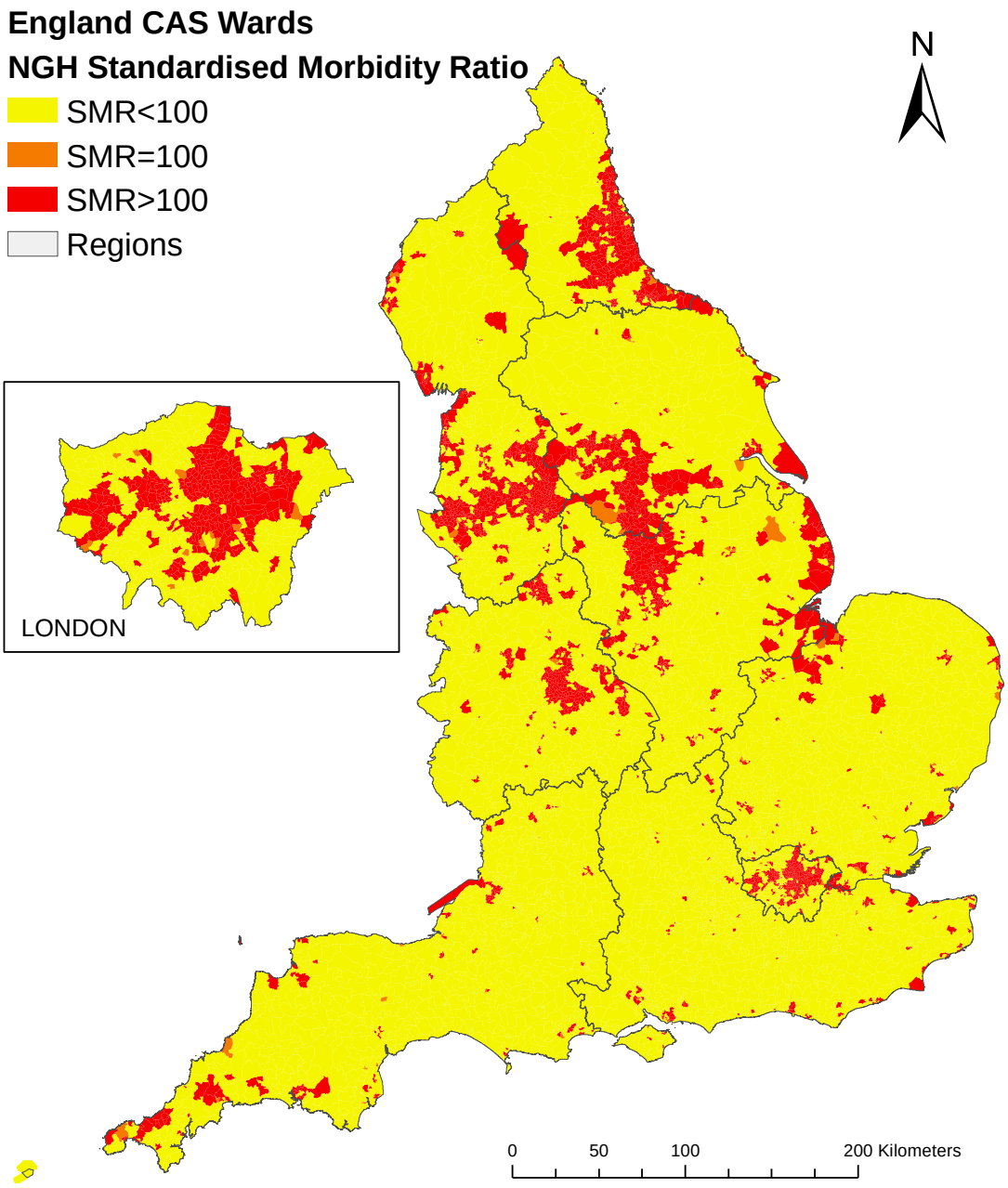


Figure 4.5: Map of limiting long-term illness SMRs (CASWARD)

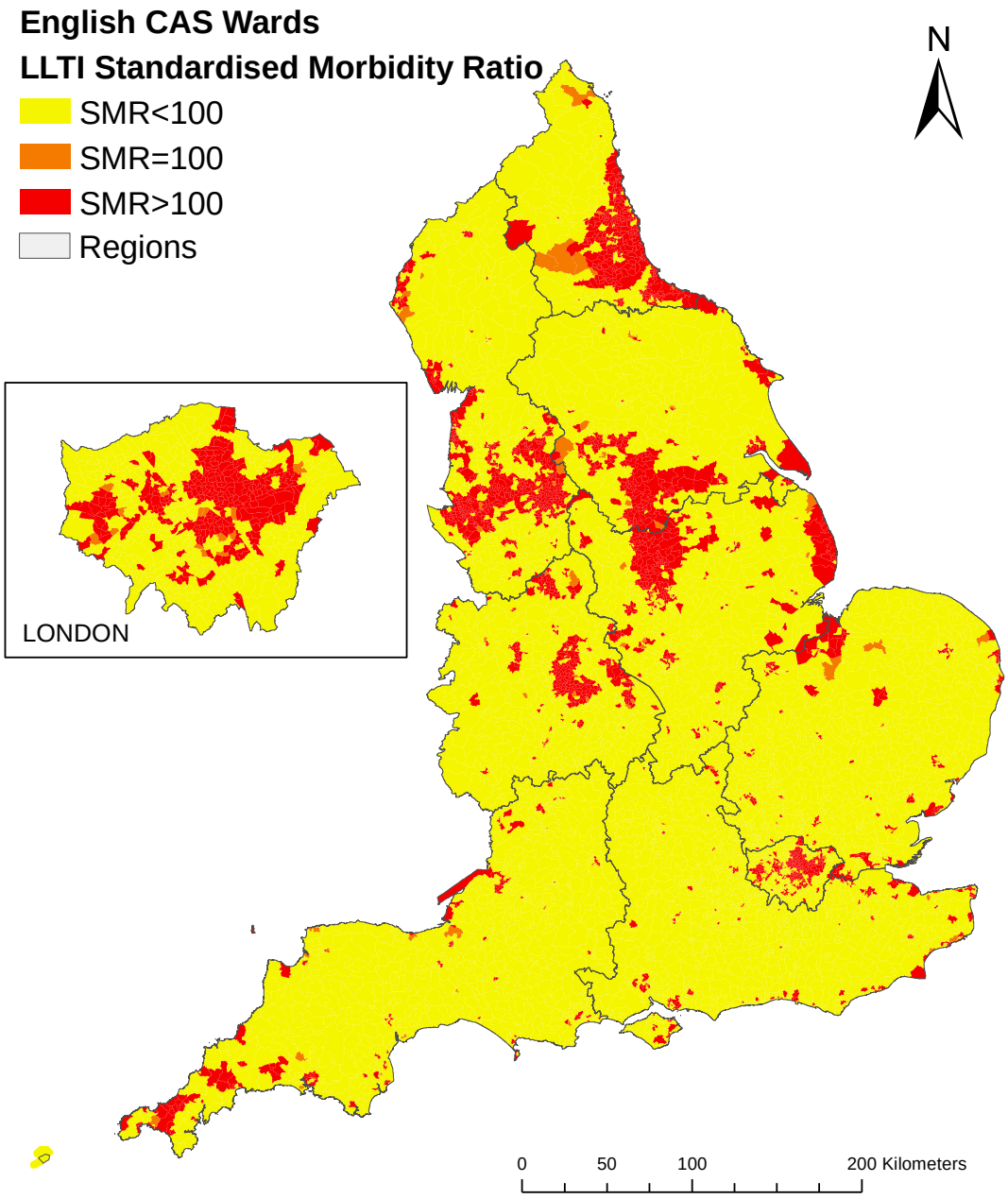


Figure 4.6: Map of premature deaths SMRs (CASWARD)

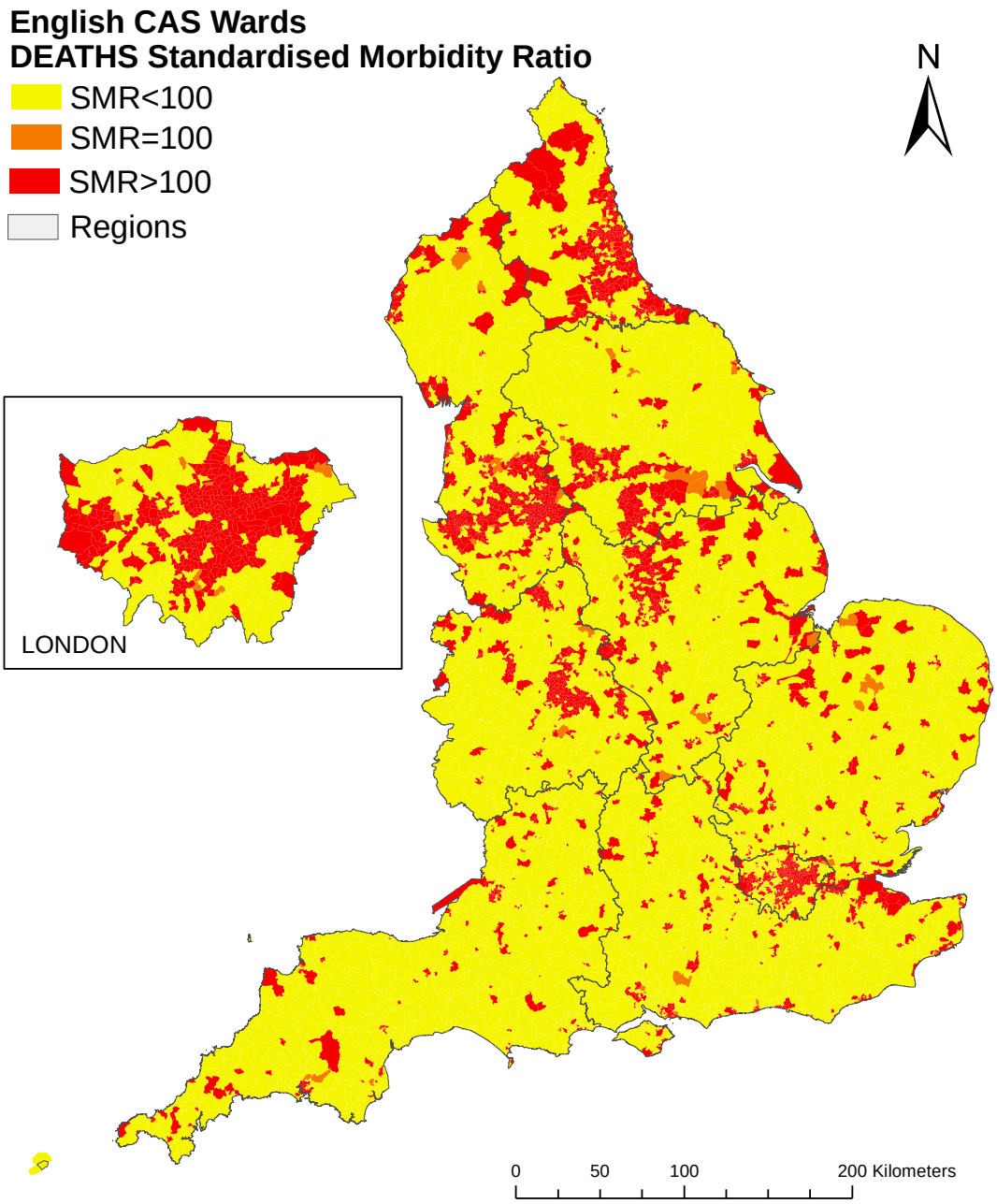


Figure 4.7: Map of deprivation (LAD)

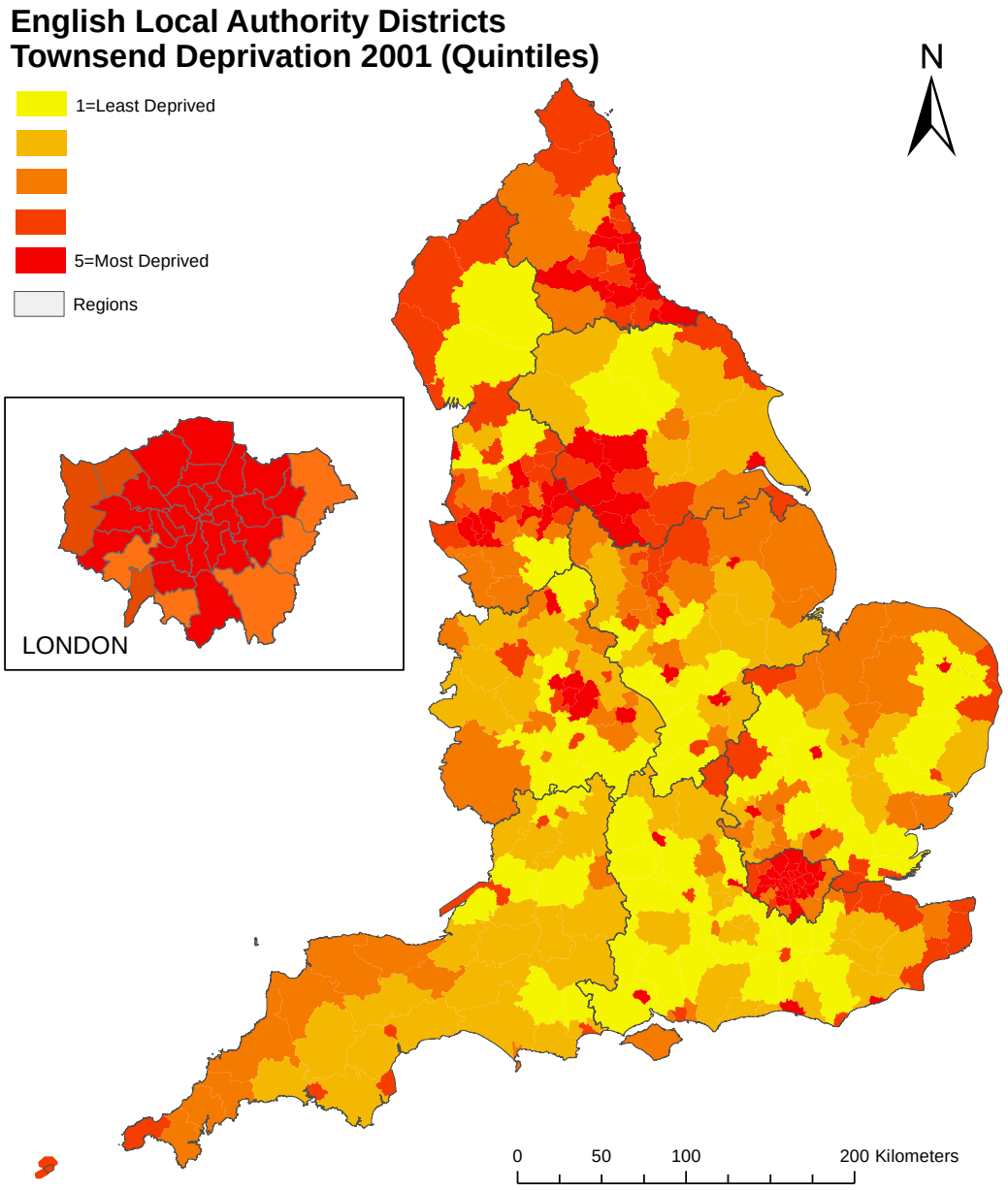
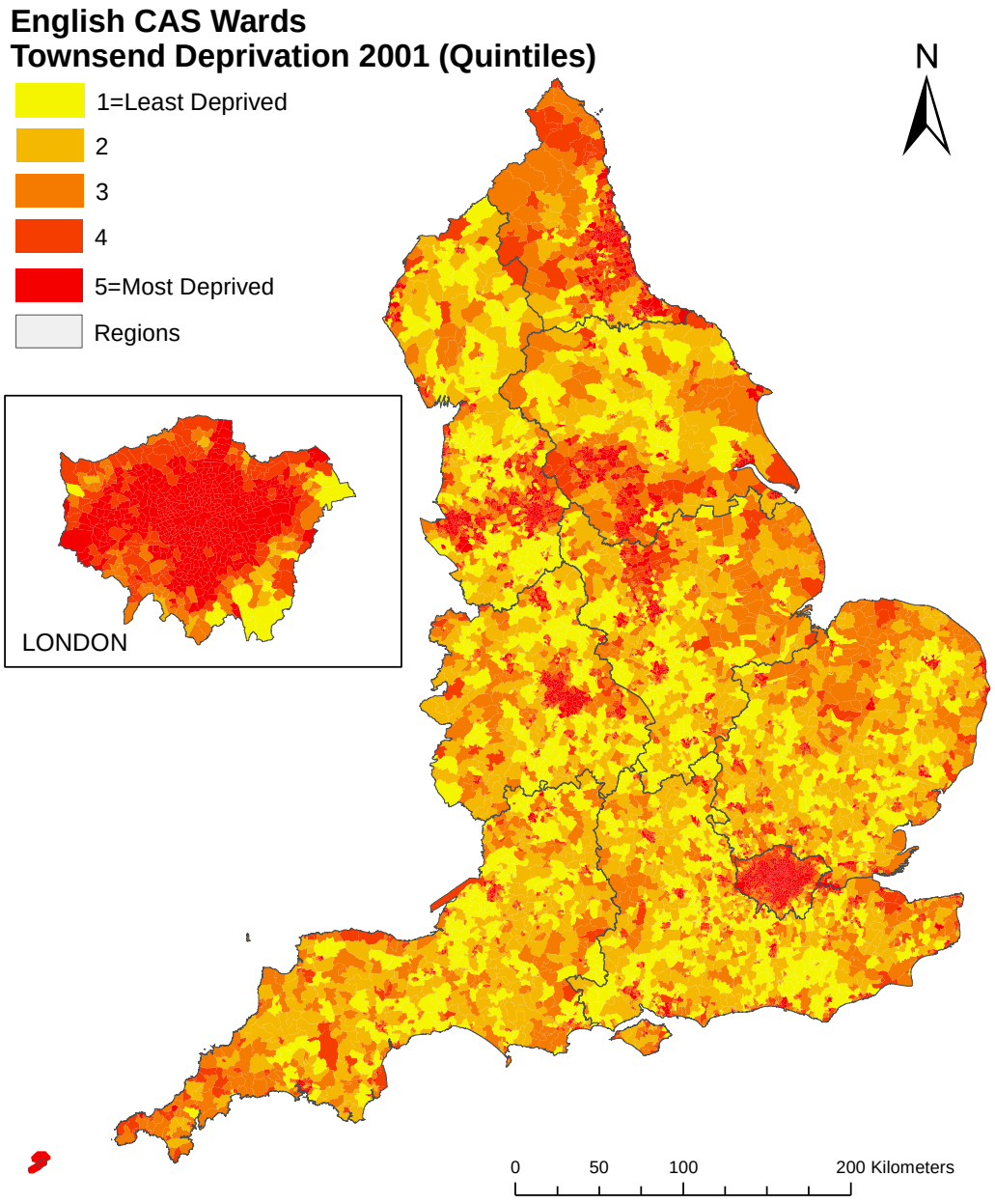


Figure 4.8: Map of deprivation (CASWARD)



Regression Tree Classification

Local authority district results

Overachievers

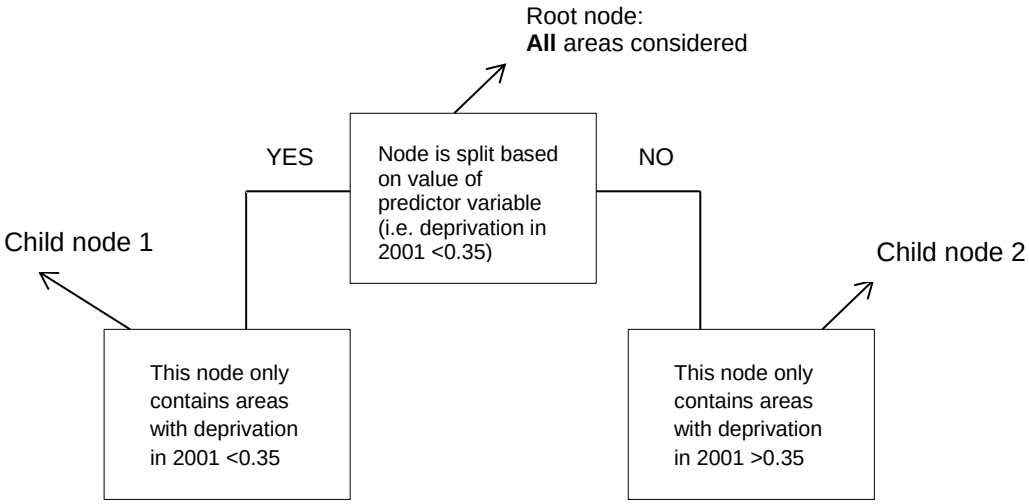
The Regression Tree Classification (RTC) method was chosen as the most appropriate statistical technique since it is able to work with the concept of

outliers, identifying those areas that appear to be over- or under-achieving compared to other similar areas (based on economic profiles).

At LAD level, RTC results are displayed in Tables 4.1 to 4.3 and the corresponding regression tree classification diagrams (Figures 4.10 to 4.12). In the tables 'Grp' refers to the group (or leaf) found in the RTC model, 'P' stands for the proportion of areas within the group that fall into the most deprived quintile over four decades, *'N'* simply refers to the number of areas within the group, 'Std. >+1.96' refers to the outliers that are underachieving (not 'resilient') in the group and 'Std. <-1.96' are the outliers that are overachieving in the group ('resilient'). The RTC diagrams illustrate the recursive partitioning of the data. Although RTC considers all of the predictor variables at each node, it only uses the variables that produce the best result (in other words, the smallest mean square error). The software checks all possible 'splitting' variables. In doing so it seeks to maximise the 'purity' of the child nodes (Lewis, 2000, p.6). Figure 4.9 provides an illustration and further description of what the RTC diagram shows. These results show that five areas were identified as 'health resilient' (having experienced four decades of being in the most 20% deprived quintile (fifth quintile) yet doing significantly better than other areas within the same group) for self-reported not good health, three areas were 'resilient' for self-reported limiting long-term illness, and three areas were 'resilient' for premature mortality. These overachieving 'resilient' LADs fell within two regions of England: London and East of England. The maps displayed in Figures 4.13 to 4.15 display the limited geographical spread within which 'health resilience' is found when

examining at LAD level compared to CASWARD, which will be presented shortly.

Figure 4.9: Regression Tree Classification Diagram Example



The tree building process can hypothetically continue this binary recursive partitioning of predictor variables (only the ones with the most predictive accuracy) until it is impossible to continue. Three processes will stop the tree building as listed by Lewis (2000, p.7):

(1) There is only one observation in each of the child nodes;
(2) All observations within each child node have the identical distribution of predictor variables, making splitting impossible;
(3) An external limit on the number of levels in the maximal tree has been set by the user ("depth" option).

However, following the above processes may result in an 'over-fitted' tree. To avoid this, 'pruning' may be used. Different pruning methods can be applied. In this analysis, the 'cost-complexity' option was used. This method relies on a complexity parameter, which can be denoted a. This is gradually increased during the pruning process. Starting at the terminal nodes (last nodes), the child nodes are pruned if the resulting change in the predicted misclassification cost is less than a times the change in tree complexity. Therefore, a can be described as a measure of how much additional accuracy a split must add to the whole tree (Lewis, 2000).

Underachievers

In terms of underachievement in health outcomes (so areas with lower levels of deprivation but poorer than expected morbidity and mortality), there was one LAD that consistently underachieved in all three outcomes: Wyre.

Table 4.1: LAD Regression Tree Classification results for Not Good Health (NGH)

Grp	P	*N*	SMR Mean	Std.Res > +1.96	Std.Res < -1.96
1	0	37	64.12	-	-
2	0	80	73.53	**Wyre**	-
3	0	63	81.51	-	-
4	0	46	91.76	-	-
5	0.17	77	108.12	St. Helens, Wakefield, Stoke-on-Trent, Barrow-in-Furne, Bolsover, Hyndburn	Reading, Cambridge, Isles of Scilly, Oxford
6	0.92	51	127.98	Tower Hamlets, Manchester, Knowsley, Liverpool, Easington	**City of London, Kensington, Wandsworth, Westminster, Harlow**

Summary from Table 4.1**:**

- LADs with low deprivation but higher than expected NGH (underachievers): Wyre
- LADs with high deprivation but lower than expected NGH (overachievers): City of London, Kensington, Wandsworth, Westminster, Harlow

Table 4.2: LAD Regression Tree Classification results for Limiting Long-Term Illness (LLTI)

Grp	P	*N*	SMR Mean	Std.Res > +1.96	Std.Res < -1.96
1	0	44	73.52	-	-
2	0	73	81.27	**Wyre**	-
3	0	63	86.21	-	-
4	0	37	94.19	-	-
5	0.04	51	101.39	Blackpool , Barrow-in-Furne, Hyndburn, Mansfield	Cambridge , Isles of Scilly
6	0.55	49	110.84	St. Helens, Stoke-on-Trent, Bolsover	Stevenage, Alnwick, Berwick-upon-Tweed, Oxford
7	1	14	108.43	Hackney, Newham, Tower Hamlets, Manchester	**City of London, Kensington**
8	0.875	16	121.13	-	**Wandsworth**
9	1	7	136.71	Easington	-

Summary from Table 4.2:

- LADs with low deprivation but higher than expected LLTI (underachievers): Wyre
- LADs with high deprivation but lower than expected LLTI (overachievers): City of London, Kensington, Wandsworth

Table 4.3: LAD Regression Tree Classification results for Premature Mortality (Deaths)

Grp	P	*N*	SMR Mean	Std.Res > +1.96	Std.Res < -1.96
1	0	119	80.54	**Wyre**	-
2	0	59	87.68	-	-
3	0	48	95.73	-	Carrick
4	0	49	104.59	Hyndburn	-
5	0.67	46	111.41	Oldham, Blackburn, Blackpool	**City of London**, Cambridge, Isles of Scilly
6	1	33	124.67	Manchester	**Kensington, Westminster**

Summary from Table 4.3:

- LADs with low deprivation but higher than expected deaths (underachievers): Wyre
- Local Authorities with high deprivation but lower than expected deaths (overachievers):
  City of London, Isles of Scilly, Kensington, Westminster

Figure 4.10: LAD Regression Tree Classification Diagram
Not Good Health (NGH)

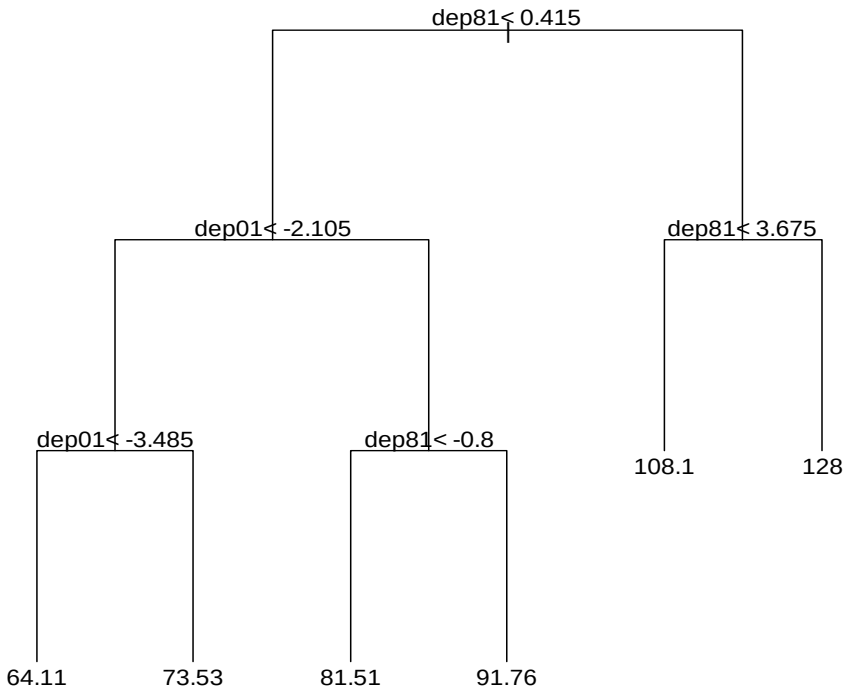


Figure 4.11: LAD Regression Tree Classification Diagram – Limiting Long-Term Illness (LLTI)

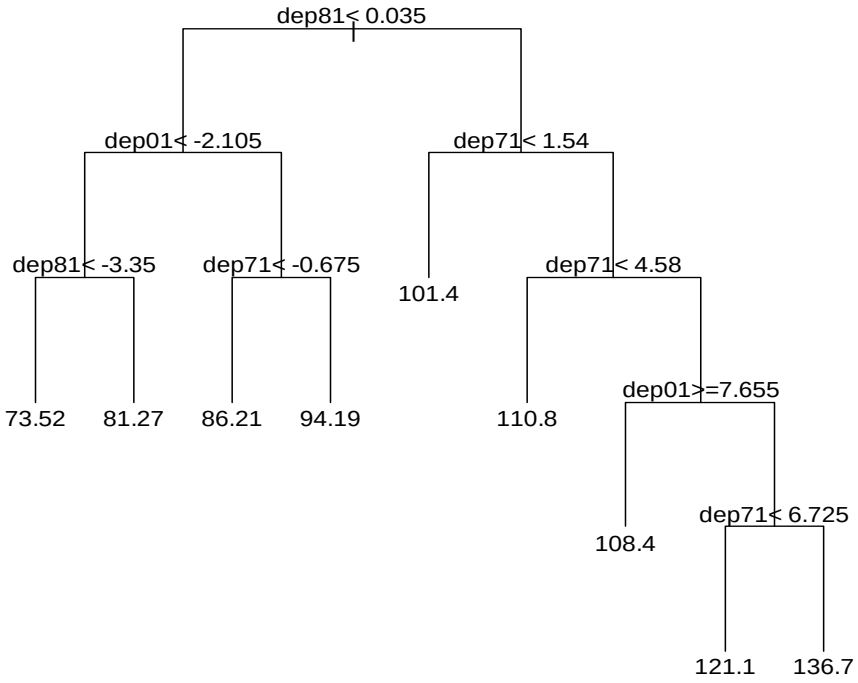
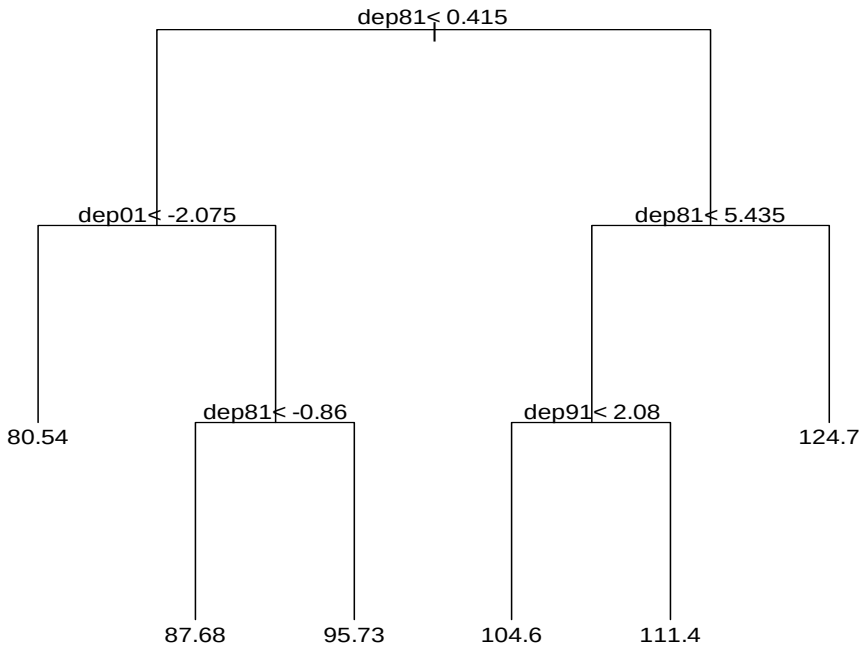


Figure 4.12: LAD Regression Tree Classification Diagram – Premature Mortality (DEATHS)



Census area statistical ward results

Overachievers

In comparison to the overachieving LAD results, a different picture emerges when smaller geographic units are considered. At CASWARD level, ninety areas are found to have exhibited 'health resilience' for self-reported not good health, eighty-eight for self-reported limiting long-term illness and sixty-two for premature mortality (Appendices 5 and 6). Importantly, the regions within which these areas fall are spread out all over the country (in comparison the LAD results presented above) – see Figures 4.13 to 4.15.

Underachievers

Appendix 6 shows all of the underachievers (classified as 'not resilient') CASWARDs, defined as those that have experienced lower levels of deprivation across all four decades but that have poorer than expected health outcomes. The majority of these 'not resilient' CASWARDs are located in the North of the country (principally the North West and North East) and the middle (East and West Midlands) with only a minority of the areas located towards the South. This may tell us something important about the local contexts in which these less deprived areas are located and, as such, why they may be experiencing poorer than expected morbidity and mortality outcomes. There could be wider socio-economic circumstances that 'pull down' these areas.

Figure 4.13: Comparison of not 'resilient' vs 'resilient' (LAD vs. CASWARD)

Not Good Health (NGH)

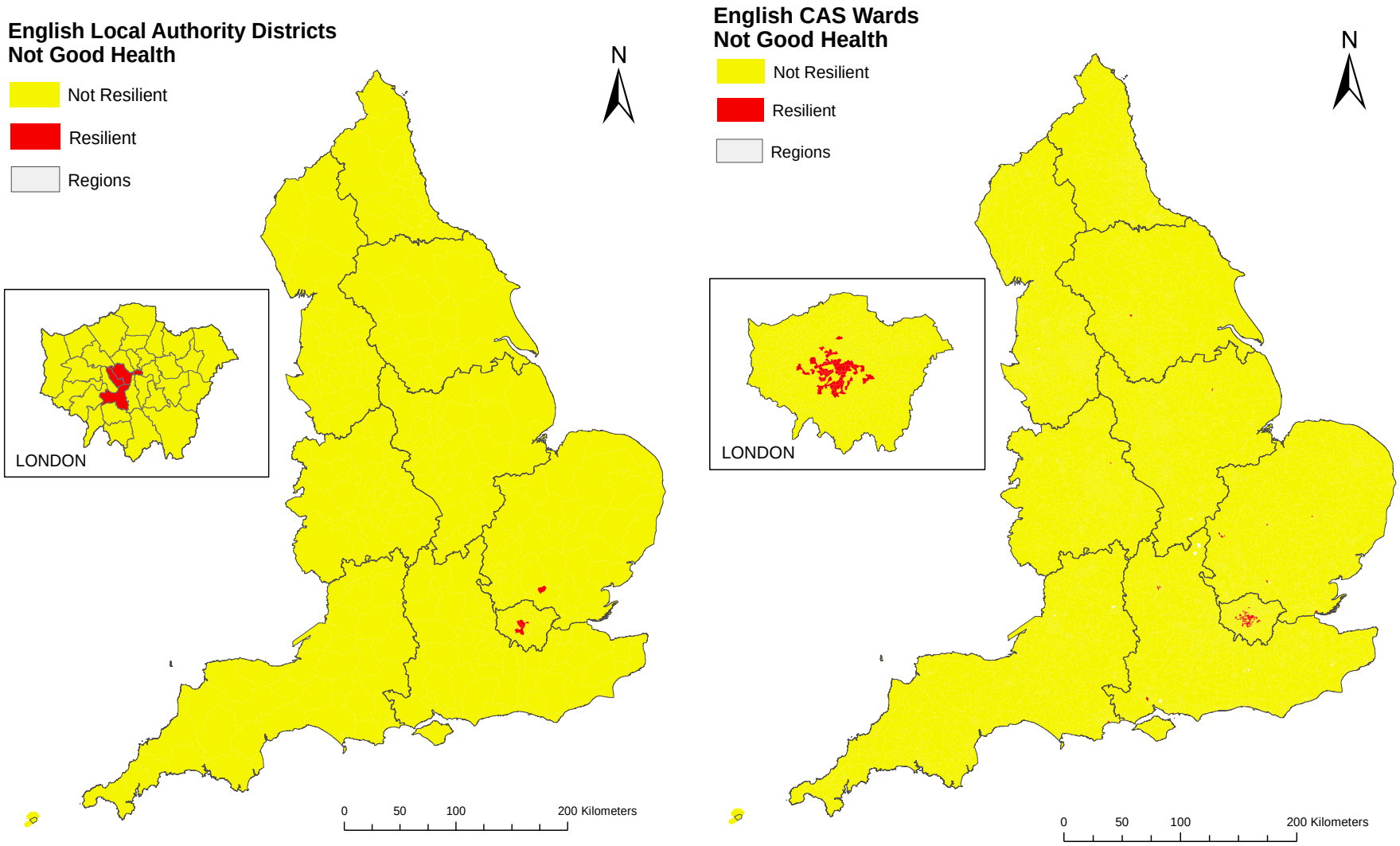


Figure 4.14: Comparison of not 'resilient' vs 'resilient' (LAD vs. CASWARD) Limiting Long-Term Illness (LLTI)

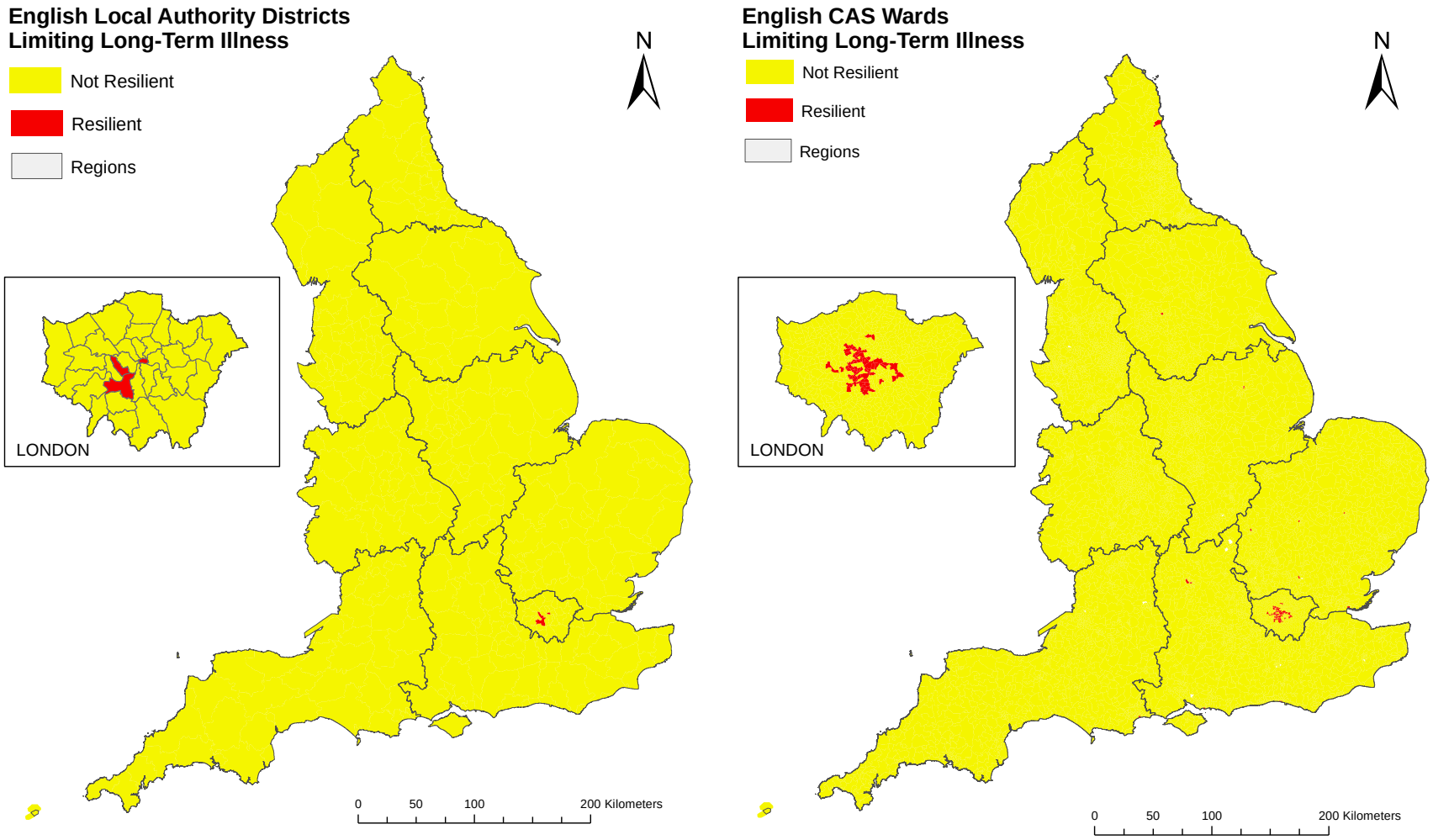
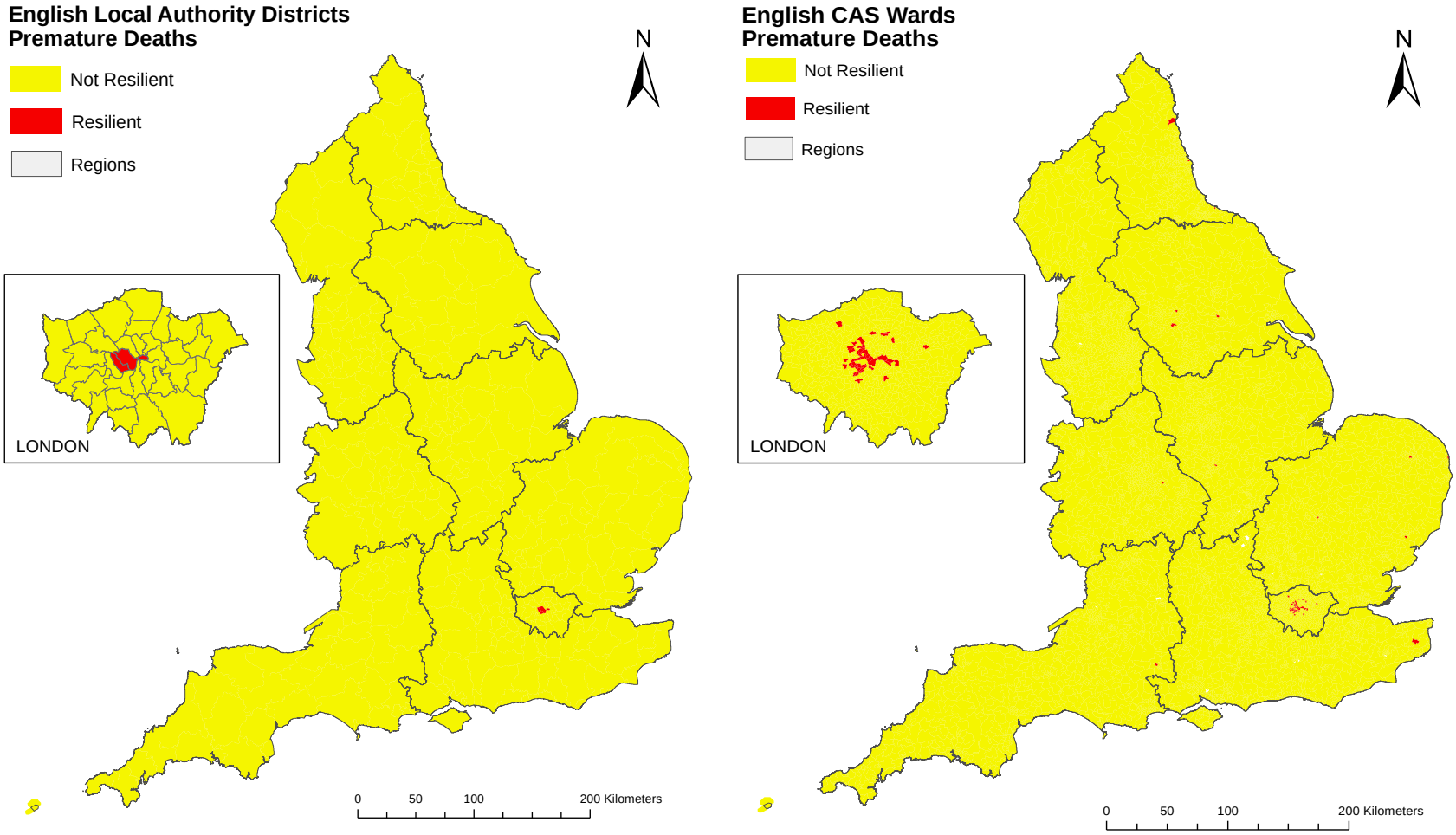


Figure 4.15: Comparison of not 'resilient' vs 'resilient' (LAD vs. CASWARD)

Premature Mortality (Deaths)



Regional breakdown of results

In their examination of health over- and under-achievement in local authorities throughout England, Doran and colleagues (2006) found that there were clear geographical patterns to health achievement (measured by life expectancy). As such they argued that the local socio-demographic and regional contexts were important to health outcomes.

As a result, in this analysis I have further broken down the RTC results by region in order to get a sense of the regions that have areas performing better than expected to see if there are any patterns in terms of regions that do particularly well and whereabouts in the country the 'health resilient' areas tend to be located. Figure 4.16 shows where the LAD 'resilient' areas fall regionally. Clearly there is not much variability with only London and the East of England regions comprising 'health resilient' LADs.

Figure 4.16: Percentage (%) of 'health resilient' areas broken down by region (LAD)

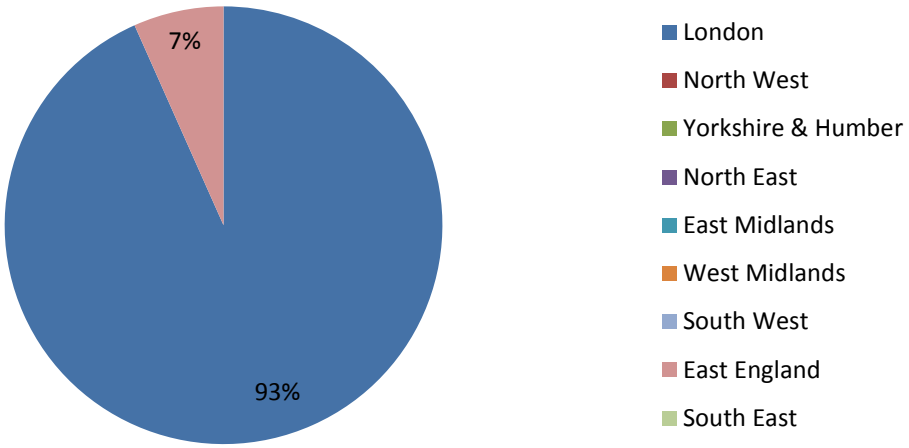
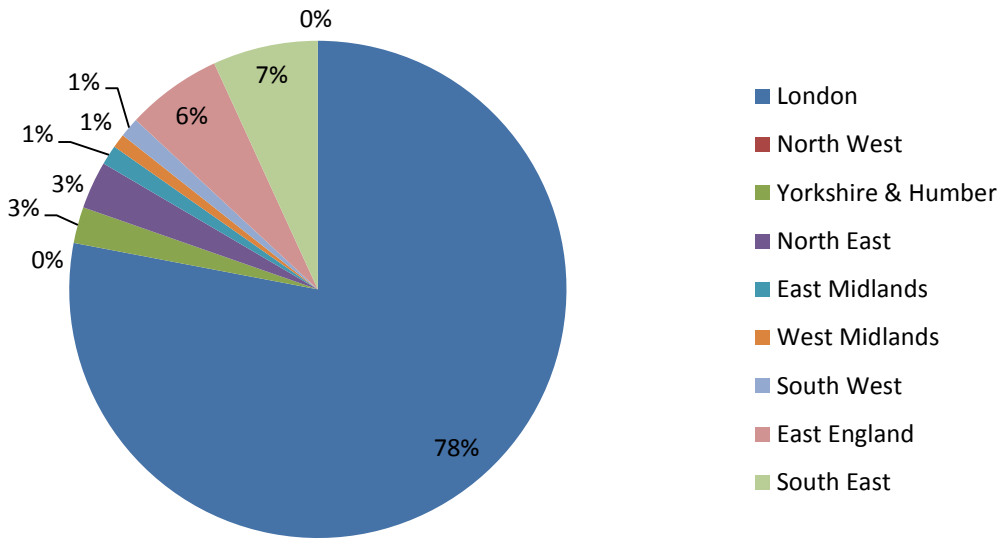


Figure 4.17: Percentage (%) of 'health resilient' areas broken down by region (CASWARD)



However, a comparison of Figures 4.16 and 4.17 demonstrates that the regional distribution of 'health resilient' areas is very different when LADs and CASWARDs are compared. Figure 4.17 shows the CASWARD results are broken down according to region and this conveys the fact that while London holds the majority of 'health resilient' areas there is also some variability with other regions, most notably the North East of England and Yorkshire & Humber, which also contain some 'health resilient' areas (although only a small percentage [3% each] but still a significant finding). Importantly, the North West had no 'health resilient' areas whatsoever.

Linking these findings back to previous research in this field, Doran *et al*. (2006) also found that local authorities in the North West region consistently had lower life expectancy. In contrast, London had the majority of local authorities that overachieved in life expectancy including two of the areas that were found to be 'resilient' in this research: Kensington and Westminster. Therefore, when

comparing the two sets of findings the same ‘health resilient’ areas are being found despite using different statistical methods and health outcomes, which might strengthen the argument that what is actually being found is indeed ‘resilience’ and not some methodological artefact.

All of these findings support those discussed in the 2010 report published by the IDeA:

> [...] it has become clear that there are large local variations in the outcomes of postindustrial regeneration in ex-coalfield and industrial areas across the UK, with some areas being more ‘resilient’ in the face of adversity and with better than expected mortality rates.
>
> (IDeA, 2010, p.22)

As demonstrated by these results, not all areas, even of the same economic circumstances such as ex-coalfield sites, experience the same health experiences, further reinforcing the argument that some areas defy the odds by achieving better than expected health outcomes whilst others have poorer health. There are clearly great variations in health outcomes throughout England (regionally and sub-regionally). This emphasises the need for a local level examination of these outcomes to capture what is really happening through a localised approach.

Local level results

LSOA analysis

In order to address the above argument that a localised examination of health and deprivation is required to really unpack the varied experiences of place on

health, further analysis was conducted at an even finer scale (below ward level) in Lower Super Output Areas (LSOAs). LSOAs for the whole of the NEE region were examined and this came to a total of 1,656 areas. The purpose of this was to identify whether or not there were any areas that emerged as 'resilient' within some of the larger geographical areas that were found to be 'resilient'. If no correspondence is found between the LSOAs and the CASWARDs or LADs which they fall into, then this begs the question about the scale at which health is examined and supports the need to examine at the smallest scale possible.

Like the LAD and CASWARD analysis outlined above, health indicators at LSOA level were indirectly age/sex standardised prior to conducting the RTC statistical technique. However, it was also decided that LSOA level data had to be spatially smoothed using Bayesian smoothing (a statistical technique which was explained in ***Chapter 3***) and this was due to the small sizes of the populations in LSOA units[9]. This was a result of the wide confidence intervals of the Standardised Morbidity/Mortality Ratios (SMRs). With such wide intervals the data were not accurate. Therefore, by spatially smoothing the health indicators prior to identifying 'health resilient' areas using RTC, I sought to make the data more reliable and accurate.

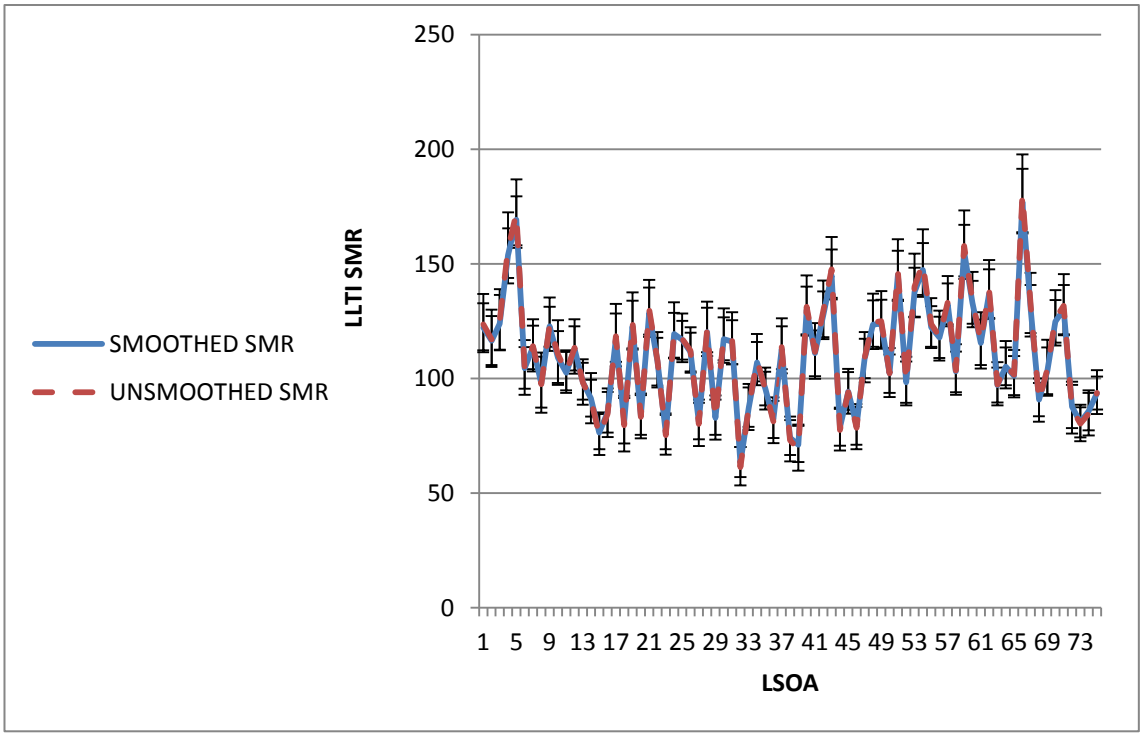
In Bayesian smoothing the number of iterations performed is completely dependent on how many iterations are required until there is clear convergence of the chains. A diagnostic test in Win Bugs (or Open Bugs), called the BGR diagnostic tool (not presented) developed by Gelman and Rubin (1992), is useful in this case, which monitors convergence between the chains used in the

[9] Spatial smoothing is a common technique used in health geography and public health. Bayesian smoothing is one such statistical method used to smooth data but there are also others, see APHO (2009), Baker et al (2008) and Holmes (2006).

Bayesian model. The chains in the model start at different initial values and we need to assess the point at which the chains start to show convergence. This test assesses three aspects: within chain variance, pooled variance and their ratios. The ratio test, R, should converge to 1 for it to illustrate convergence. Also, the pooled and within interval widths should begin to stabilise, as was the case for all three health outcomes. It is not possible to actually prove that they have converged fully but we can tell if there has been no convergence through the BGR diagnostic tool. When I did the smoothing I found that for all three health indicators used in this study the most optimum beginning value was around 9,000/10,000 mark. Prior to this value there was no convergence between the two chains. I therefore decided to use 9,000/10,000 as the beginning value.

After the models had “burned out” for each of the health outcomes, I was then able to examine the statistical values; these are the new smoothed SMR values with lower and upper confidence intervals. Bayesian smoothing was successful at narrowing the previously wide 95% confidence intervals – Figure 4.18 shows this for LLTI. The red line plots the old SMR values for LLTI and the blue line plots the new smoothed SMR values. The vertical axis is the SMR and the horizontal axis is the LSOA area. Due to the large number of LSOAs in the NE region (1,656) only some of them are displayed in this figure.

Figure 4.18: Line graph of smoothed versus unsmoothed SMR values (example shown for limiting long-term illness)



The error bars for each line displayed in Figure 4.18 show that for all LSOAs the smoothed SMR (blue line) values have smaller confidence intervals compared to the unsmoothed SMR (dotted red line). In some cases this is more apparent than in others but for every single SMR the confidence intervals were significantly smaller. Consequently, the smoothed SMRs were used in the RTC and are presented in the RTC results that follow. Appendix 8 shows maps of smoothed versus unsmoothed SMRs for all three health indicators (premature deaths, not good health and limiting long-term illness respectively).

Regression Tree Classification results: LSOA

Overachievers

Results from the RTC analysis at LSOA level are shown in Appendix 9. Out of 1,656 LSOAs, ten (0.6%) areas were identified as 'health resilient' for the premature deaths health outcome; only one (0.06%) area for not good health; and, five (0.3%) for limiting long-term illness. Therefore, only a small number of areas were identified as 'resilient' for each health indicator, with the most 'resilient' for premature deaths. When examining whether or not any of the areas were consistently 'resilient' in all three health outcomes, no areas were identified. This shows that there is not only variability in 'resilience' at different geographic scales but also across health outcomes; some areas did better than expected in mortality but not morbidity and vice versa.

Underachievers

The majority of underachieving ('not resilient') LSOAs appear to be in Easington for limiting long-term illness and not good health (premature deaths have some underachievers in Easington but not so many by comparison). This finding seems to resonate with earlier discussions in this chapter about the local contexts being important and perhaps these contexts may 'pull down' less deprived areas in terms of producing poorer health outcomes than would be expected. Easington as a whole is considered to be amongst one of the most economically deprived areas in the country and an area where the poorest health outcomes are concentrated which will come as no surprise. Therefore, this may partly explain why even areas with less deprivation that fall into the

Easington boundaries are performing less well compared to other areas in the RTC group that share similar economic profiles.

Local authority district breakdown of findings

LSOAs were assigned to corresponding Local Authorities – Figures 4.18 to 4.21 show the breakdown of 'resilient' LSOAs and which local authorities they fall into. For premature deaths the 'resilient' LSOAs fell into five local authorities: Blyth Valley, Sunderland, South Tyneside, North Tyneside and Newcastle upon Tyne. For limiting long-term illness they fell into two local authorities: South Tyneside and Newcastle upon Tyne. For not good health, the only 'resilient' LSOA fell into Newcastle upon Tyne local authority. These five local authorities are the only ones that contained 'health resilient' areas. When comparing back to local authority level analysis, these areas were not found to be 'resilient' when in fact there appears to be some smaller pockets of the areas that have overachieved according to these fine scale results.

There is a question to do with whether or not there are any commonalities between the local authorities identified as having 'resilient' LSOAs. For example, it may be that local authorities share similar local policies or area-based initiatives. Interestingly, all of the local authorities are neighbours on the map so this may make a difference. The issue of neighbouring may be important as some of the LSOAs were neighbours but not all. Working with artificial administrative boundaries may not be able to capture the processes operating across boundaries. Again the local contexts within which the 'resilient' and not 'resilient' areas are located may make a difference to health achievement as has been found in a previous study.

Figure 4.19: Percentage (%) of 'health resilient' LSOAs (for limiting long-term illness)

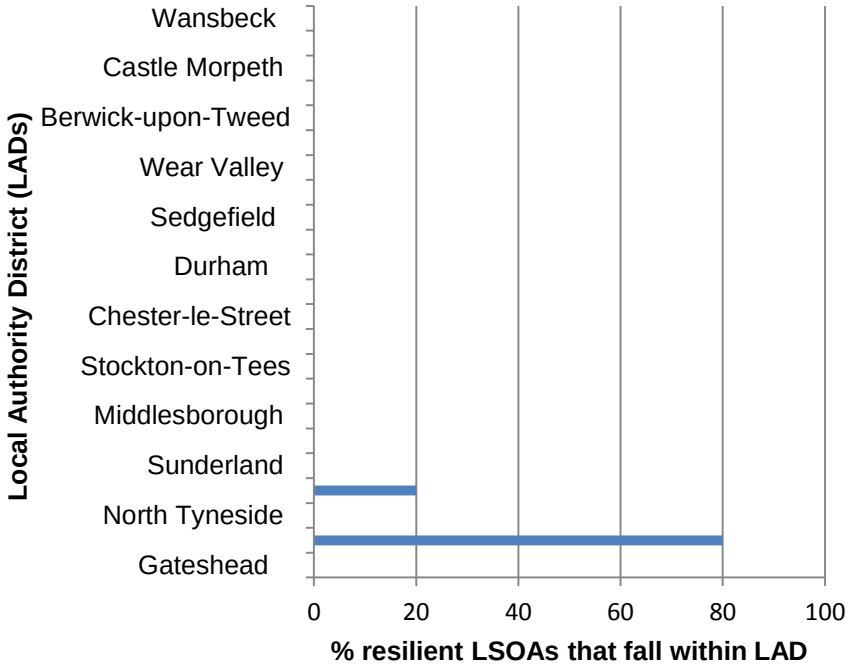


Figure 4.20:
Percentage (%) of 'health resilient' LSOAs (for not good health)

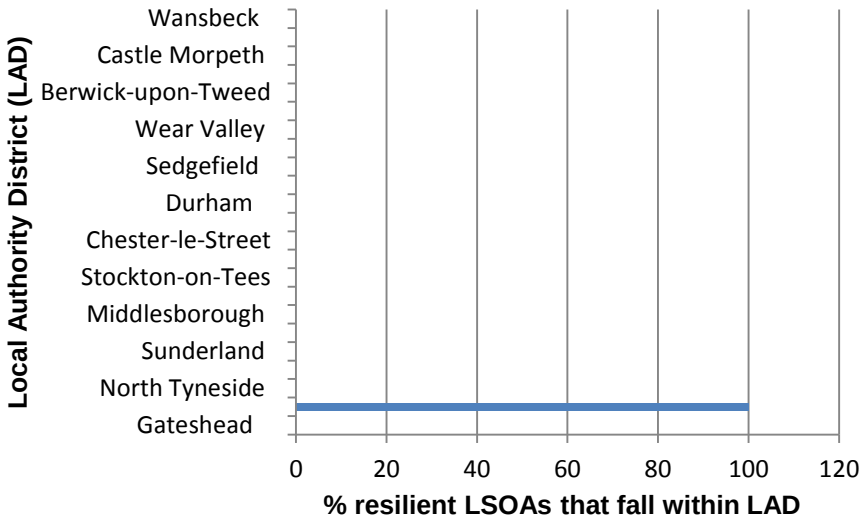
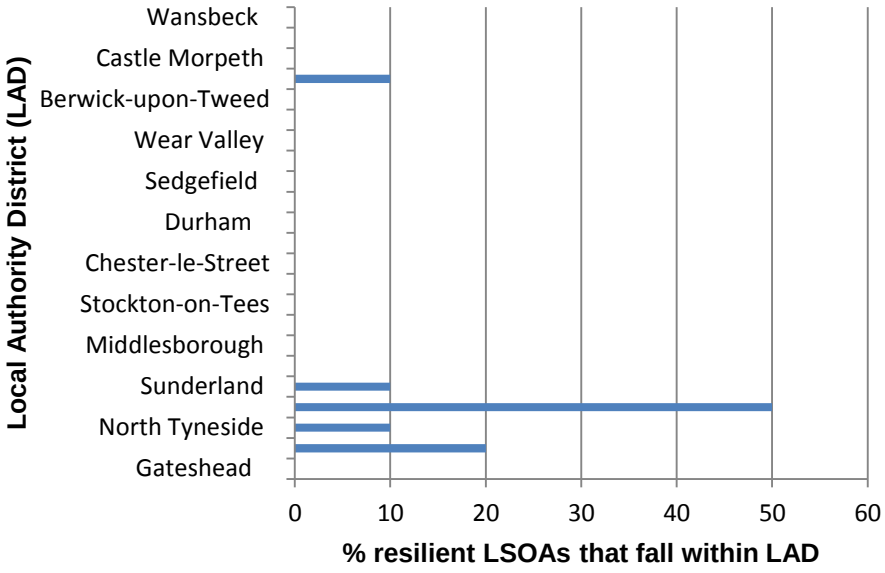


Figure 4.21: Percentage (%) of 'health resilient' LSOAs (for Premature deaths)



Discussion

These findings reveal that there are some areas, at different geographic scales, that defy the odds. Certainly, the scale used in the identification of 'health resilient' areas has implications. At the local authority level only a few areas were identified as 'resilient' based on the method used in this analysis. However, analysis at a finer scale showed that areas that were identified as 'resilient' at ward or LSOA level did not neatly nest into the 'resilient' local authorities. This may imply that the identification of 'health resilience' is an artefact of the methodological technique used. This is something that will be explored further in the case study. The results showed that there was also regional variation in terms of which regions 'resilient' and not 'resilient' areas fell into. This indicates that there is much variation missed at this large scale.

Situating these findings within wider area-level 'health resilience' research, the study by Tunstall *et al.* (2007) found that South Shields and Sunderland North were 'health resilient' in terms of mortality at parliamentary constituency level. So although they used a different method and spatial scale they still identified areas in the North East that overlap with the local authorities that have been found to contain some smaller pockets of 'resilient' areas. In addition, I have already mentioned the similar findings between my results and Doran *et al*.'s (2006) results. Therefore, the argument that the identification of 'health resilience' is merely a methodological artefact may be weakened by this triangulation of findings with other studies researching the same phenomenon.

There appears to be a 'London effect' underlying the identification of 'health resilience' for all three health outcomes at LAD and CASWARD level. Again, Doran *et al.*'s (2006) study found similar associations in Inner London for life expectancy whereby LADs in London had high levels of deprivation (measured by Townsend) but high life expectancy. They postulate that while it is possible that the Townsend measure of deprivation overestimated the extent of deprivation within these LADs, the associations were similar when other measures of deprivation (Carstairs, Jarman and IMD) were examined. Therefore, they speculate about the possible explanations underlying this 'London effect' and discuss the concentration of the nation's financial and cultural resources in London is likely to have beneficial effects on residents and attracts young, healthy people to the capital (compared to other districts there is also a greater concentration of young and highly qualified individuals that populate these region).

The results presented in this chapter need to be considered in light of the limitations of the analysis. Firstly, deaths were assigned to LAD/CASWARD/LSOA where they were resident at time of death but it is not possible to obtain information on the duration of residence in this location. Therefore, it is unclear whether or not their death is a result of the area (contextual influences) or not. Unfortunately, there is no way of obtaining this information.

Secondly, the health indicators are from the 2001 (or a couple of years either side of 2001 for five years premature deaths data) Census so it may be possible that the health outcomes have changed since then. However, the indicators were the most up to date at the time of the research and the results from the 2011 Census have yet to be published, thus denying the possibility of looking at trends in health outcomes between the decennial censuses. Also, there is no reason why I would expect health to be drastically different today compared to 2001 (with the exception of the current economic crisis which may have exacerbated poor health in deprived areas – this may be something for future research). However, the issue of not being able to look at health trends is of paramount importance, since cross-sectional data has its limitations in not being able to examine trajectories. After all an area may be 'resilient' at the time of the analysis but the situation may be different prior to the years in which the health data are examined or afterwards. Therefore, caution needs to be exercised with regards to classifying an area as 'health resilient' as this may not necessarily be the case if different years were examined. So without having more recent data to compare with the study is limited to the assertions that can be made about 'health resilience'.

Despite these recognised limitations, the strength of the findings lies in the consistency of the results with previous studies. Moreover, a finer scale analysis has complemented what is already known about 'health resilience' as no study to date has examined at such a fine scale.

Chapter 5

"Coal was a way of life":

Resources for 'health resilience'

Several important factors have emerged from the case study research and these are presented in this section. These factors are divided into two over-arching themes: Resources for 'health resilience' and risks to sustaining 'health resilience'. This chapter discusses the resources for 'health resilience' whilst ***Chapter 6*** focuses on the risks to achieving and sustaining 'health resilience' and the complexity underlying the concept of 'resilience'. The protective features that were identified in the case study element of the research include the importance of a strong shared industrial history, attachment to place, place identity, social capital, the natural environment, and rurality.

The first section of this chapter draws upon the notion of *place biographies* – the idea that a place is constituted over time and the biography of a place (past, present, and future) is important in shaping residents' health and well-being. Two related concepts -*place attachment* and *place identity*- derived from environmental psychology are explored to provide a conceptual framework for understanding how place may be important for health. *Practised* place is described in relation to story-telling and how these narratives re-enact place and reinforce attachment to place. Memory and nostalgia are also discussed with reference to emotional geographies literature. Such a perspective allows us to understand the processes through which attachment to place (re)develops

through time and space, and how this may be of significance to population health

The second section of this chapter discusses the findings relating to social capital. I situate these findings within the wider body of literature on social capital and health, which argues that higher levels of social capital in an area relate to better health outcomes. As mentioned in ***Chapter 2***, social capital is usually divided into two distinct categories: *Bridging* and *bonding.* There is also an argument for a less cohesive and more divisive form of social capital, which is discussed as a third dimension in this chapter and further in ***Chapter 6***. These concepts of social capital are explored and interrogated in relation to the empirical findings presented here. The concept of *Gemeinschaft* is also used as a way of framing the unique bond felt by the former mining community.

The third section thinks through the importance of natural surroundings for population health. The concepts of *therapeutic landscapes*, *biophilia* and *topophilia* are used to conceptualise how the relationship that co-exists between the natural environment and local residents is significant for health. Attention Restoration Theory (ART) may also be another way to understand how the natural environment may positively impact upon health, which will also be considered.

Rurality and its impact on the community also emerged in the research findings. Studies that have examined the impact of rurality on health show mixed findings. There is a degree of ambiguity in terms of the impact living in a rural area has on population health. This study has found that it has had a positive effect on health (to a certain extent); however, as will be discussed in ***Chapter***

6, there are also some negative implications of living in a rural area with regards to local services and goods, which may be detrimental to health and as such present risks to 'health resilience'.

Finally, the findings in this chapter are examined in further statistical analyses. Results from Factor Analysis, Multiple Correspondence Analysis and Logistic Regression are presented in order to investigate whether or not the findings from the case study have wider transferability to other similarly economically deprived areas throughout England, thus fostering 'health resilience' in other settings.

Place biographies

The idea of place biographies is originally inspired by Pred's (1984, p.279) postulation that place is 'the formation of biographies'. He talks of place as being a historically contingent process. In addition, Warren (2011) coined the term 'biographies of place'. He argues that place biographies are highly significant as 'they not only form the backdrop to working lives but are instrumental in producing distinctive cultures of work and shaping the social relations of the workplace' (p.270). This emerged as a strong finding in this case study in that the coal-mining industry not only dominated working life, it also significantly shaped social life and contributed to the formation of a community within the workplace, and this further extended to daily social relations outside the workplace. Therefore, the notion that places have biographies has emerged as being particularly important in this thesis and this will become more apparent as I proceed to discuss the continued significance of coal-mining for local

residents in Chevington. In many of the interviews local residents described the place that they live in as 'rooted' in the historical legacy of coal-mining.

Mining past: A "paradise lost"

Figure 5.1: Plaque where the former Chevington Drift used to be

Historically, the Parish of Chevington comprised four settlements: North Broomhill, South Broomhill, Red Row and Chevington Drift. The area had one coal-mining pit, Broomhill Colliery, based in North Broomhill (see coal-mining workings in Appendix 10). The coal mining industry was everything to this community. During the early-mid 1990s the local government had limited powers; it was the miner's union that controlled everything in the locality and sourced all amenities and resources in the area, which further reinforced the importance of this industry.

Due to a fire that cut off mining workings in 1894, the Broomhill colliery decided to sink a Drift (known as the 'Chevington Drift' or simply the 'Drift'). The new

Drift settlement was in complete isolation from the other settlements. Because of this isolation, it was decided that there would be two miner's unions: Broomhill and Chevington Drift. The new settlement in Chevington Drift was occupied by young, married couples and families. These families were located in one of four rows of housing: Hedgehope, Linhope, Hartside & Simonside.

The focal point of the new settlement was the Chapel and the Institute (otherwise known as the 'Tute'). Red Row was the main shopping centre at the time and had rows of shops including bakers, butchers, Co-operative, a picture house and a bank that served the local residents in Red Row and the surrounding areas (North Broomhill, South Broomhill and Chevington Drift).

The isolation of the Drift was of paramount importance to the creation of sense of place felt by the residents. There was a distinct separation (both socially and in terms of work), which reinforced a greater sense of identity compared to North Broomhill, for example. It has been referred to as a "paradise lost" by a former resident.

Housing was owned by the National Coal Board whereby a large proportion of housing was sub-standard, particularly in South Broomhill. During the 1950s, the Morpeth Rural District Council (forerunner to Castle Morpeth Council) decided to change the housing situation by creating a new settlement: Hadston. There were three phases of development in this Hadston settlement. The first phase (throughout 1950s) comprised of the re-location of residents from South Broomhill. The second phase (during the 1960s) involved the re-location of Chevington Drift residents. The third phase (1990s onwards) involved an influx of newcomers into the area through housing regeneration, which will be

explored further in ***Chapter 6***. The second phase is of prime importance as it involved the re-location of miners and their families from the Drift to Hadston.

As shown by the various phases of development, Hadston was not solely occupied by families that lived at the Drift, but it was also occupied by those that had previously lived at North Broomhill (or the North end as it is often known by locals) and South Broomhill. However, once families from the Drift gradually moved into Hadston it became largely Drift-dominated with the rows of housing that were named after the four rows that were at the Drift (Hedgehope, Linhope, Hartside & Simonside). Dr Eric Wade, a former resident at North Broomhill and ex-miner, talks of the 'social engineering' that accompanied the re-location of Drift residents. He said that the Morpeth Rural District Council wanted to almost re-create the sense of place that existed in the Drift by naming entire rows after those located at the Drift. A similar process took place at Radcliffe, another former coalfield village close-by; however, this re-creation of place in New Radcliffe in Amble was less successful. The Drift was unique in its isolated position and the sense of place and community that was formed there. The sense of identity that was associated with Radcliffe was nowhere near as strong as it was at the Drift.

Gilbert (1995, p.51) talks of the stereotypical conceptions of mining communities: 'tightly-knit single-industry communities, socially and often geographically isolated and distinctive'. Whilst it is recognised that not all former mining communities can be described as such due to how divergent some mining settlements were, this statement depicts this particular Drift community well.

It is argued that this shared local history outlined above is important in terms of wider determinants of health, since everything in the locality was controlled by the NCB: social clubs, housing and employment. Most importantly, the characteristics associated with the coal-mining industry such as camaraderie, trust and reciprocity permeated into the local community and as a result social capital was strengthened; however, strong social capital was not equally distributed among residents as I will shortly discuss.

Legacy of coal mining: A shared history

> In British mining localities [...] there was much evidence of [...] both traditional ties and emotional attachment to a locality, and of their historical basis.
>
> (Warwick and Littlejohn, 1992, p.16)

Mining communities share a common heritage. In the above quotation Warwick and Littlejohn highlight the place attachment that is contingent on the historical processes experienced in mining areas. The shared history of coal-mining was an especially strong discourse that prevailed for most of the residents that engaged in this research. Whilst it is noted that this sense of history was particularly salient amongst the older residents (and former Drift occupants), it was still of great significance and a source of pride to other age groups, especially those who had families that worked in the mines, or had worked as miners themselves. In the following I frame discussions around place attachment and identity, practised place, mining community, and emotional geographies (relating to memory and nostalgia) as these were the most

dominant accounts and most relevant (in terms of health determinants) factors that emerged from the interviews and focus groups.

Place attachment and place identity

Place attachment has been defined as 'an affective bond or link between people and specific places' (Hidalgo and Hernández, 2001, p.274). Place identity, as defined by Proshansky *et al*. (1983), is a personal construction which 'grows out of direct experiences with the physical environment' (p.62). Both concepts of place attachment and place identity are rooted in the work of environmental psychology; however, the concept has also been adopted by human geographers (Tuan, 1980; Buttimer, 1980). Although conceptions of 'place' vary among these authors, the fundamental idea of place identity is shared. It refers to the personal attachment acquired by individuals to their environmental surroundings, in which they develop a sense of belonging.

In one of the focus groups a local resident speaks of her reasons for remaining in the area all of her life and never wanting to move:

> *We've got roots here and they're deep roots [...] If I go somewhere else I'm nobody.* (Anne, late 50s, local resident, focus group)

Even for a relative 'newcomer' (a commonly used term to refer to newer residents) that moved into Chevington in 2005, she talks of feeling more 'grounded' in this locality:

> *I feel more grounded here than I have done, I think, in probably any other place I've lived actually.* (Rachel, late 30s, local resident, interview)

She attributes this feeling to a combination of factors related to the locality, mainly the surrounding Druridge Bay Country Park and strong sense of community that she felt instantly when she moved into the area. She also links this to her increased health and well-being, acknowledging that this has *"had a positive impact on my health"*. These types of narratives are not in isolation. In fact, most residents that were interviewed similarly described their attachment and affection for the locality and local surroundings.

'Practised' place

Place was pivotal in many of the interview and focus group narratives and story-telling was at the heart of this. Story-telling was common among miners and continues to be. Such story-telling related to the old Drift, the annual galas that brought the community together, where they would play as kids, where the current plaque is in memory of the Drift, and so forth. Place has been socially (re)constructed through these narratives. Muzumdar and Muzumdar (2004, p.385) argue that 'place is learned through the process of socialization involving rituals, use of artefacts, story-telling'. In turn, place attachment was produced and reproduced via these mining-related stories. This may have important implications for health as these stories brought people together and reinforced a sense of shared place attachment and collective experience of place. This common ground for individuals has nurtured this bond to the place in which they still live, and importantly to each other.

The following poem is taken from *A collection of photographs showing life in Broomhill, Chevington Drift & Red Row* by the Hadston History Group.

The Auld Drift

Aa went doon ti the sea the uther day.

And aa looked ower to the heaps of clay.

Aye, that was where the auld Drift stud

There amang the clarts and mud.

As stud for a while and aa started ti smile

Thinking aboot the way it was.

Simonside and Hartside, they were right lang raes.

Hedgehope and Linhope and the auld folk places,

Nowt there noo but open spaces.

Nae club or Pub – Nae Post Office or store

No, there’s nowt left any more.

Gone are aal the gardens, full of tetties.

Gone are aal the middens and the netties.

Nae mare hen or pidgeon crees.

Nae mare lads playing billiards in the Tute.

Nae mare wives hinging tha weshing oot.

Nae mare singing in Jo Hakin’s chapel.

Nae mare pinching Tommy Hetherington’s apple.

Aye aa them days are past, nowt there noo but open cast.

But aa still think aboot yisterday

And aal the games we used to play

Ower in the park.

Running around till it wus dark.

The men playing quoits on the corner there an aal.

The youngins playing knockie nine doors

Doon the raes.

The wives seeking the witter in the pails.

The post lass on hor bike wi the mail.

The aad wives ganning ti the store.

Standing taking for an hoor or more.
Aye it wus a grand place for a crack.
Sum of them went and forgot to cum back.
Aye it’ll niver be the same agen.
Are aal ee folks happy uve gon.
Doon ti Hadston wi aal its mod cons
Aa still think it wus a Bloody (oops pardon) cryin shem
When they pulled doon the Drift
Wor Auld Home.

This poem (by unknown author) encapsulates the types of narratives that emerged in the research. Again, place is constructed, or practised, through this narration of how the old locality was before the closure of the Drift.

Emotional geographies: memory and nostalgia

A number of residents made reference to the past and expressed nostalgia when reminiscing back to the mining days and the old community life:

> *I always remember when Rita. […] She moved over here [Hadston] and I went to see her and she just sat and cried and cried and I says: "Rita, for goodness sake, what's the matter?". "Oh, I miss the Drift", she says, "I miss it". She says when you came here it was like you were put in a little cage and that was it.* (Betty, early 70s, local resident, focus group)

To Betty and Rita this “little cage” denotes a positive view of what the Drift community was like. This nostalgic sentiment resonates with a number of discussions with local residents during the research, and reinforces the

importance of the past and how it has shaped the way residents feel about their locality and the bonds that keep them fixed to the place.

Casey (1987, p.183 cited in Jones 2005) argues that memory is spatial and bounded by emotional attachments to place:

> *Only consider how often a memory is either of a place itself or of an event or person in a place: and conversely, how unusual it is to remember a placeless person or an event not stationed in some specific locale.*

Jones (2005) proposes that 'being-in-place' through the emotions of place is indeed a powerful aspect of emotional geographies of the self thus inherent in place identity formation. Moreover, the concept of topophilia can be used to conceptualise this affective bond between the residents and place (Tuan, 1974).

However, as the pits began to close as coal resources became exhausted during the 1960s, the fabric of the community started to fray. Many changes accompanied the collapse of coal-mining in the area and one of the most important was the way in which the community fragmented and became more spread out. It was no longer a "little cage" as one resident referred to it as. Some of the lamentable changes are discussed in the following quotations.

> *The community is not the same here [Hadston]. Not the same as the pit village.* (Mick, late 70s, local resident and ex-miner, interview)

> *So it is totally different now. It is a lot bigger than what it used to be from when I moved here.* (Christine, late 40s, community centre caretaker &

local resident, Interview)

To a certain extent the "community spirit" changed as well, as a couple of the residents pointed out:

> *I am pleased the coal mines have gone but on the other hand I'm not pleased because we lost a lot of what we had: the community spirit and the togetherness that were there.* (Jim, late 40s, previous resident, interview)

> *Well, how it's changed, a lot of my generation and older will say that you haven't got that community spirit what we had with the old village.* (Peter, late 40s, local resident, focus group)

However, despite some of the negative impacts that accompanied the closure of the mines such as impacting on community spirit, there are still strong traces of a close tight-knit community, as explored in the following section.

This section has explored the strong emotional attachments residents have with place and how this has contributed to the formation of a sense of place. These findings are believed to be significant for health. Williams (1998) asserts that a psychologically rooted environment is an important component in the health process as it provides 'an integrative network of physical, spiritual and psychological factors merging together to promote the creation of a healing and/or healthy place' (p.1198).

Social capital

There is a strong body of literature on the role of social capital and its positive impacts on health and well-being (Kawachi et al, 2007). A number of health

outcomes have been measured against levels of social capital. It is well-known that strong social networks and cohesive communities are typical of ex-mining communities, as we have already seen in the previous section. There has been much written on this by Bulmer (1978) and Warwick and Littlejohn (1992), who have researched former coal-mining communities in England (County Durham and West Yorkshire respectively). Findings concerning the importance of social capital are thus perhaps unsurprising yet nonetheless extremely significant in this study of Chevington. This section considers four aspects of social capital: mining community, keeping the community together, social ties and networks, and feeling safe. *Bridging* and *bonding* concepts of social capital are used throughout to frame these empirical findings.

Mining community: "Their community was their church"

Narratives related to the previous coal-mining industry were well versed. Coal mining was described as an all-encompassing feature of their lives, not solely as a means of employment; it was a "way of life" as described by a few research participants.

Many residents commented on the tight-knit community life and the "*sense of belonging"* that was part and parcel of living in a coal-mining community:

> *And I do think that in society there was the pitmen and they were a very very close-knit people and to get in on them sometimes was very difficult but they looked after their own*.
>
> (Jim, late 40s, previous resident, interview)

> *I mean it's not anywhere near as strong now but like when we came from the Drift it was like. .'Cos everybody moved into the same streets...and for a while it was before other people started moving away and other people coming in. It was just like a kind of an extension really. 'Cos it was really insular. It is just a sense of belonging. I really feel this is where I belong […] Not in a kinda parochial sort of...but like sort of my heart is here.* (Derek, mid 40s, local resident, interview)

The term 'insular' used by Derek invokes a sense of 'closeness', a term also used by a previous resident:

> *Everybody was close - everybody. I've never known a closeness like this anywhere.* (Jim, late 40s, previous resident, interview)

However, it also implies that the community is inward-looking, which has also been discussed in social capital literature in relation to homogeneous groups (Ferlander, 2007). This may have negative implications, which is discussed further in ***Chapter 6***, whereby I argue that certain combinations of bonding and bridging social capital may lead to the formation of social divisions.

Trust and teamwork were also important elements of working in the coal mining industry and this permeated into community relations:

> *The camaraderie was second to none. You relied on each other for protection. They watched your back and you watched theirs.* (Peter, late 40s, local resident, focus group)

> *I think, you know, wherever you go, whenever you go to a former mining community, that there is always* ***a strong sense of community***

> *because, you know, those people had to work together, support each other and protect each other. Because, well you know, when you're down the mines and you know it's about teamwork.* (Michael, late 20s, community centre project lead & local Parish Councillor, interview)

Putnam's (1995, p.67) description of social capital as 'features of social organisation, such as networks, norms, and social trust that facilitate coordination and cooperation for mutual benefit' reinforces the bonding social capital that operated, and continues to operate, within this case study area.

Keeping the community together

Although the previous section discussed the profound changes in the community since the closure of the mines, community still featured as being important to many of the local residents.

> *I think the former Drift community is very strong and it still has a dominant presence within this community*. (Michael, late 20s, community centre project lead & local Parish Councillor, interview)

In a focus group at one of the community centres based in Hadston, it was discovered that the local residents raise money through a weekly draw in order to have groups meet in the centre. They pay rent and find the funds to host such groups and meetings and when asked why they do this one of the residents responded as follows:

> *This is 'cos we're like the old Drifters still trying to keep the community together.* (Pauline, late 60s, local resident, focus group)

It is clear that for some residents *"keeping the community together"* is a key concern and this can be traced back to the mining days and how "old Drifters" used to come together. Some models of social capital view it as partly to do with access to resources. For instance, Bourdieu's (1986) definition of social capital as 'the aggregate of actual or potential resources linked to the possession of a durable [social] network' (p.248). Carpiano (2007) argues that these resources that Bourdieu refers to can be drawn upon by group members either in the absence (or in conjunction) of economic capital. This seems to resonate with these residents as they talk about the importance of having these shared resources in the local community centre despite the fact that these resources are not funded by the Council but by the local residents themselves, perhaps further reinforcing this notion of social capital according to a resource-based definition.

This example of the community working together also ties in with the notion of *gemeinschaft*, a term coined by German sociologist Ferdinand Tönnies in 1877 (Translated by Loomis, 2002). This literally translates as 'community' and refers to the mutual bonds shared by a neighbourhood and how they come together over a common goal. The goal in this example is to keep the community strong by continuing to provide a social space in which residents can come together. Community building has been on the political agenda in more recent years with David Cameron's Big Society and the Localism Bill, which will be discussed further in ***Chapter 7***.

Community capacity building is being increasingly referred to in public health

research (Lovell *et al*., 2011). Traditionally used in health promotion studies, Labonte and Laverack (2001) define it as an 'increase in community groups' ability to define, assess, analyze and act on health (or any other) concerns' (p.115). This type of community building was also evident in other examples in the research, as will shortly be discussed.

Social ties and social networks

Cattell (2001) states that informal and formal social networks are essential components of social capital as they can provide social support, identity, self-esteem, and personal control. Cattell's study in East London showed that social networks played a mediating role between poverty and poor health. Similarly, the significance of social networks has emerged strongly in this thesis.

> *That fascinated me when I came here. They all had their relatives across the corner; across the road. It was amazing; they had this great network of people.* (Dorothy, early 60s, Mother's Union Leader, focus group)

As Dorothy points out in the above quotation the "network of people" that constitutes the locality is extremely significant. Social networks are undeniably strong in the area. The majority of residents have lots of close social ties consisting of family, friends and neighbours in the locality. The social support they receive from them is highly valued.

When asked whether she knew the neighbours, Laura mentioned:

> *A lot of them I know. One of my best friends just lives across the road. We know a few others round here as well. I know next door that way - they're fairly new that's moved in that way. My brother and his girlfriend they just live round the corner.* (Laura, early 30s, local resident, interview)

Doreen talks about not wanting to leave the area due to the strong social support she has:

> *No we didn't want to go anywhere else [...] I mean and we've got friends round about. We never bother each other but I've got good neighbours but they're there if I need them. You know you can rely on them*. (Doreen, early 80s, local resident, interview)

One resident explains how public funding to the local Sure Start centre had been cut and that meant that it could no longer supply childminding services to the residents in the neighbourhood and how she would be at a loss without the help of her family around her:

> *If I was stuck and if I didn't have my family around then I would have had nothing.* (Laura, early 30s, local resident, interview)

Similar narratives prevailed in terms of depending on social support from family for childminding, mobility and health problems. Susanne discussed how that was the reason why she had actually moved back to the local neighbouring area when her and her partner started to have children:

> *It was to come back mainly cos my mum and dad were going to do the childminding for us. So that was the draw.* (Susanne, early 40s, previous resident, interview)

The significance of family also prevailed throughout conversations. Michael talks about this:

> *Because I mean yes we've got a lot of deprivation, I mean yes we've got a lot of families with issues, but we also have a lot of families that may well have deprivation but they've got a very strong family base and very strong family values and that'll continue regardless of a financial situation. They will always protect, look after and respect their own families and they're very strong about that. And I think that's always one thing that smacks you in the face working round here is the families and the strength of the families.* (Michael, late 20s, community project leader and local Parish Councillor, interview)

Perceptions of crime: feeling safe

Levels of crime and feeling safe have previously been used as proxies of social capital. In the interviews and focus groups residents were asked about how they perceived crime in the area and whether or not they felt safe. Almost all residents that participated in the research said they felt safe in the neighbourhood and that there was little much crime in the area, certainly not of a serious nature. Some exceptions to this include older, more vulnerable residents, who mentioned that they would sometimes feel intimidated when they walked through the local precinct when crowds of young people would congregate this space.

A local area initiative also contributed to feeling safe and keeping crime levels down, called 'Beat' meetings. A local police officer comes once a month and reports on the crimes recorded in the locality. Local residents have the opportunity to come to the meetings and voice any concerns they may have. These meetings have been well received and so much so that the Resident's Association in the area pay for this resource as they felt it was worth keeping after the initial funding for the project came to an end.

> *They [Resident's Association] agreed that it was a success and they agreed it was a good way of community tensions and feelings and getting community involved.* (Steven, mid 40s, local police officer, interview)

Linking back to the idea of community building and how can help with health promotion, Hawe *et al*. (1997) argue that one of the key benefits is that it should be sustainable and continue to be sustained beyond funded life. In this example, the Residents Association have ensured that these meetings have continued past the initial funding allocated to the project and this has been sustained for several years, which reinforces the strength of the interest in the community working together.

Bonding and bridging social capital

As already discussed in ***Chapter 2***, there are two important concepts that may be used to understand how social capital works: *bonding* and *bridging*. Bonding social capital is undoubtedly the strongest in this case study area with regards to high social support and social networks as illustrated in the empirical findings

that have been discussed in this chapter. Within this study bridging social capital, on the other hand, did not emerge as strongly with the exception of the local Beat meetings, whereby diverse members of the community attended the monthly meetings (those who did not appear to know each other that well, or in some cases at all).

Studies have investigated the differential effects of these two distinctive forms of social capital on health outcomes (Cattell, 2004; Kim *et al*., 2006; Ferlander, 2007; Iwase *et al*., 2012). Ferlander (2007) discusses the mixed health effects of these different forms of social capital. For instance, she talks about bonding social capital as positive for health because it provides emotional support, which is protective for mental health (via emotional support, personal control and stress reduction). However, she also states how bonding ties can also have negative health effects (via behaviour mechanisms such as promoting unhealthy normative behaviour).

In the same vein, she discusses how bridging social capital can be positive for health in terms of control of deviancy and through reinforcement of positive health norms but might restrict control of individuals that are subordinate. Therefore, social capital may not necessarily be entirely positive for all health outcomes, or indeed all social groups. There may then be a case for a third dimension of social capital, which I call 'divisive social capital'. This type of social capital is characterised by high levels of bonding (thus positively influencing health for those within these homogenous social groups) but low levels of bridging (forming fractured communities). There is a danger that such

a combination would result in an uneven distribution of health-promoting influences and further fragment already divided communities. This may also exacerbate health inequalities instead of narrowing them.

Competing accounts of social capital

It has been argued that social capital is not uniformly acquired by everyone; rather, social capital is differentially distributed across different social groups (Lin, 2000), which may include gender, age, and duration of residence. In this section I discuss competing narratives related to all three axes.

For men, social capital appears to be inextricably linked to the industrial past whereby either these men were previously pit men or their fathers/grandfathers were engaged in coal-mining. For example, Jim, Derek, Peter and Michael all discussed the strong sense of community and camaraderie connected to coal-mining in previous sections of this chapter.

However, it is also clear that the mining community permeated into many of the interview and focus group discussions, not solely from the accounts by men but also from some of the women. Elizabeth (a long-term resident in her 70s), for instance, says that you *"could feel the community spirit when you went to the Drift"*. But quite a few of the residents felt that the community has *"changed for the worse now"* (Charlie, 70s). This was echoed by both Peter and Doreen who talked about the changes in a lamentable way. Firstly, Peter remarks *"we haven't got that community spirit that we used to have in the old village"*. Similarly, Doreen, a long-term older resident in her 80s, mentions that once the Drift closed and "*since we shifted everybody just seemed to go on their*

own...you know...you don't seem to help neighbours. Not like what you had down there". She subsequently goes on to discuss how this shift *"spoilt the community"*. For Robert, a former miner in his 80s, *"the community changed altogether…the closeness has gone"*. On the other hand, some of the residents were of the opinion that the former Drift community is still strong. Michael, especially, believes that there is still a strong community: "*the former Drift community is very strong and still has a dominant presence within this community"*. Pauline also states that there are still some Drifters that are actively involved in the community, for instance by raising funds for community groups, and when I asked her why this was the case she stated that it was because *"old Drifters were still trying to keep the community together"*. Even Doreen admits that she has *"good neighbours"* who are there if she needs them but she doesn't bother them. This may show some of the residual community spirit from the former Drift and that the community is not completely spoiled. Social capital can therefore be argued to be linked to economic institution – the former mining industry, mainly, but not exclusively for men, since it is clear that women who lived at the Drift and were married to ex-miners were also shaped by the *"way of life"* that accompanied mining. All of these residents except Michael are long-term residents either from birth or have lived in the area while the Drift was still open so have lived through the transition yet there are clearly varying narratives related to the current strength of the community.

Alternatively, for many of the women that participated in this research, social capital was either 'borrowed' (Lin, 1999) from marrying a well-respected coal-miner, as was the case for Doreen who moved to the Drift when she married

her husband who worked in the colliery, or social capital was obtained through what may be described as the 'domestic realm'. For example, many of the women (examples given in ***Chapter 6***) who participated in the research discussed how at first they found it difficult to integrate into this tight-knit community but by taking their children to school, Sure Start or by attending the Mother's Union at the local Church they managed to become accepted by locals. Two examples of this are Christine and Laura who both discuss how they only managed to integrate into the community through having children, both having moved into the area as a young mother after marrying someone from the locality. Without this connection they felt that it would have been more difficult to integrate because it is *"close-knit"*. These institutions (Sure Start and schools) were more conducive to them meeting and socialising with other mothers, thus building social ties and networks through these spheres of life as opposed to industrial ties. Likewise, O'Neill *et al*.'s (2005) findings support this in their analyses that show marked differences in the different types of organisations that men and women may acquire social capital. They found that men typically participated in political parties, unions, professional associations, and sports clubs whereas women participated in religious, educational and voluntary associations (although their analysis showed no significant difference in educational associations between men and women). This case study echoes some of O'Neill *et al*.'s findings but educational associations were the strongest for women and there was no mention of social capital being acquired by men through such institutions.

However, it is important to note that these findings are generalisations and Louise (50s) in this research tells a different story about her experiences of moving into the neighbourhood when she met Peter, a resident from birth and former miner, which is in contrast to the accounts by Christine (40s) and Laura (30s). She feels the community is very *"tick"* (in other words, cliquey) despite having lived here for 29 years. She also had two young children when she moved to the area but unlike Christine and Laura above so did not acquire friendships via school (Sure Start was not around when she moved with young children). Louise and Peter have a stark difference of opinion with regards to community acceptance of incoming residents:

> *Louise: I'm not...I think you have to be born here to be. But it's very cliquey.*
>
> *Peter: I think what Louise means by cliquey is it's cliquey now...*
>
> *Louise: Even now it's still the same.*
>
> *Peter: I know but in the past it wasn't cliquey (…) When we were young it was never cliquey. Everybody was you know it was a proper community.*

As Louise points out to Peter, even now, despite living in the area for a substantial amount of time, she still feels like an outsider and not fully accepted by the long-standing community. Peter, on the other hand, a resident from birth, finds it hard to accept the difficulties for Louise in terms of integration and acceptance from locals, possibly because of his positive experiences and memories of the Drift community. 'Inside' and 'outside' are two key themes that manifested in many of the conversations and are explore in more depth in

Chapter 6. Acceptance from the community of incoming residents is closely linked to duration of residence. If born in the area or moved close to birth, there appears to be a general acceptance from others that they are part of the community. However, if residents have only been here for a 'short' period of time (less than 30 years) then it is much more difficult. Again, this may link back to shared experiences of being at the Drift before relocating to Hadston after the Drift closure. Collective memories and history is definitely an important precursor for being part of the community and accepted by other longstanding members of the community.

Lin (1999, p467) argues that 'social capital is contingent on initial positions in the social hierarchies as well as on extensity of social ties.' Therefore, it might be understandable why some of the female residents who moved into the area due to marriage had difficulties integrating and consequently differential access to social capital compared to men. However, Daniel, a newcomer in his 30s, who has lived in the area for a year, has also found it difficult to build friendships with the *"older, more established residents"*. He has only managed to form friendships with other relatively new residents in the new build houses close to where he lives. Therefore, it is fair to say that the difficulty of social integration into a tight-knit community is not limited to women. In terms of age, Christine and Louise are of a similar age and length of duration, as are Laura and Daniel yet they have completely contrasting experiences of moving into and socially integrating within the area.

Gender and age were two important factors that could account for differences in perceptions of safety. For instance, Betty, who is in her 70s, comments that she *"feels intimated"* when walking around the precinct (the central hub where

amenities are), particularly at night. Likewise, Dorothy (60s) says that "*I must admit if I see kids hanging around I am concerned and I do watch them. I wouldn't trust them as far as I could see them some of them. So you know you do keep an eye on them".* On the other hand, Rachel who is in her 30s, states that she isn't *"perturbed"* by the rise in crime. Laura also *"feels safe";* although she says she is not affected by crime where she lives in the new builds as most of the crime is concentrated in the council housing estate. None of the men who participated in the research expressed a concern about crime or not feeling safe. This may be related to reputation and status to a certain extent, again linking back to mining, whereby the former miners were and still are respected characters in the community by most residents. Again, this is not limited to men; Pauline, a well-known and respected Drifter who was born and bred in this area had an opposing view to Betty in the focus group as she feels completely safe walking around the precinct, even at night when young people are congregating round the shops.

Therefore, it is clear from these varying accounts that experiences related to aspects of social capital (namely community spirit, social integration and perceptions of safety) were not universal. There were contrasts in relation to gender, age and duration of residence, although gender seemed to be the most significant axis that conveyed notable differences in the discussions of each of these aspects of social capital.

Therapeutic natural environment

The natural environment was another key attribute that was highly important to the local residents. This was partly related to the past and symbolic features

and partly to do with the therapeutic benefits of being around nature. The aesthetics of the natural environment also played a role in its significance.

The North East is home to many national parks, national trails, heritage coastal sites and areas of ‘outstanding natural beauty’ located on the Northumberland coastline according to Natural England. More specifically, in Northumberland there are 28 local nature reserves (Northumberland Council: www.northumberland.gov.uk – last accessed 25/09/2012) and many conservation sites with an abundance of wildlife species and protected areas. On the borders of Chevington there is Druridge Bay Country Park. This park was restored from an old opencast mine and it has an aesthetically magnificent landscape. It is centred on a lake, with surrounding meadows and woods. The locality is also surrounded by countryside, Druridge Bay and plenty of public bridleways (See Figure 5.2).

Figure 5.2: Surrounding natural environment

This relationship between the natural environment and local residents may be framed using three conceptual frameworks: *therapeutic landscapes, biophilia* and *topophilia* (presented in ***Chapter 2***). Likewise, ART may be another way of conceptualising this relationship.

Gesler's (1991) concept of therapeutic landscapes appears to be evident in these narratives, particularly the quote by Daniel (below). The natural, social and to some extent symbolic environments (relating to coal-mining) seem to be significant features of the locality to many of the residents and it can be argued to be health-promoting in spite of challenging and changing circumstances.

> *The beach is something that I certainly use quite a lot and being able to get to the coast is very important. For playing around or chilling out; it allows you to escape. It's not only health as in fitness and exercise but also freedom and being able to relax is very important.* (Daniel, late 30s, local resident, interview)

Biophilic and ART responses to the natural environment are also evident in the following quotations below as Dorothy describes the beauty in the natural surroundings (in relation to the beach and the hills):

> *Well the whole area is lovely. I mean you just need to look...You can see the Cheviots. Well here you can go to the beach. We've got the most beautiful beach […] If you've got a car, you can go up to the hills. You can be up the hills in three quarters of an hour. You can get a bus to Alnwick, Ashington, Morpeth. You can get a train from Alnmouth up to Edinburgh, to York, to Durham. So you know I just think it's great.* (Dorothy, early 60s, Mother's Union Leader and local resident, focus

group)

The notion of topophilia developed by Tuan (1980) may also be another way to conceptualise this relationship and the significance of the natural environment for residents. Topophilia literally means *love of place*. Tuan (1974, p.93) defines it to include 'all of the human being's affective ties' with the environment. He explains how an 'awareness of the past is an important element in the love of place' (p.99). Again, this can be linked back to the idea of place biographies and how the past shapes the future experience and attachment to place for residents. In both narratives given by Anne and Jim the past is represented as being an important feature of the natural environment and how they interact with it.

> *A lot of people go there 'cos they're going back home; they're going to the Drift [...] Like I go to the beach via the road, which I still call the Drift road, 'cos they put a road back in to get to the beach*. (Anne, late 40s, local resident, focus group)

> *I mean you look at the pitmen painters and artists in the area and they proved that just because you're from this area you can understand art and you can understand this closeness between nature and the people. Sometimes the local people might not understand or know why there is a closeness but there is a closeness. And I think it probably comes from the fact that when we were growing up and money was tight we lived a lot off the land. So rabbits and pheasants and ducks and fish you know.* (Jim, late 40s, previous resident, interview)

Allotments and gardens also featured strongly when speaking with local residents. When asked about what may be protective for health in the area, one respondent commented as follows:

> *I think a lot of that comes from the allotments. A lot of people grow fruit and vegetables and that's been traditional. And you see grandparents with grandchildren and indeed their children and they all participate in the allotments – a kinda family affair. And, you know, we've got the schools – they have gardens and grow vegetables. They grow and eat them and they cook them at school. So we've really focused education-wise in schools really on the health, impact of health to people. But I think traditionally I would put a lot of it down to, you know, the allotments, the fitness of people because people go walking – they're proud of the beach, they're proud of the Country Parks. They're proud of their gardens and leek-growing shows and all the traditional things but obviously working in gardens like that it's exercise and it's out in the fresh air. So, I think maybe that has quite a lot to do with it to do with it. And we've got horses and local farms and, you know.*
>
> (Michael, late 20s, community project leader and local Parish Councillor, interview)

Milligan and colleagues (2004) examined how allotments might contribute to enhanced health and well-being amongst older people in Northern England. They attribute their findings to sense of achievement, satisfaction and aesthetic pleasure gained from gardening pursuits. An interviewee in my research talks of the "sense of achievement from it [allotments]" and so this resonates with findings from Milligan *et al*.'s research. They also discuss their findings in

relation to allotments being inclusionary spaces for which older people might find supportive and a space in which social networks are formed and maintained. This supportive environment may be a significant aspect of allotments for the residents in Chevington. Milligan *et al.* (ibid.) argue that allotments can produce a therapeutic landscape that enhances quality of life and emotional well-being in older people. I would additionally argue that there are also two other important reasons underlying why these practices may be important for increased health and well-being. Firstly, the sense of community involved in terms of the garden and leek competitions, as mentioned by Michael, is also important. Leeks shows were discussed by many older residents. It is a long-standing tradition in the community that brought everyone together – young and old – regardless of whether or not they were involved in growing fruit and vegetables. David speaks of the reasons behind the strong tradition of allotments in the area:

> *It's just I suppose it's always been traditional around here, especially with the old miners. I think they spent as much time underground and every chance they got to be out in the fresh air was a bonus. So get out in your garden you know. Of course there was competitions for who could grow the best leeks and you know things like that.* (David, mid 60s, Parish Councillor and local resident, interview)

Whilst the competitions are not so prevalent in the area now, the demand for allotments is ever-growing. David goes on to discuss how there is a waiting list for allotments and the Parish Council's hard efforts to create new ones:

> *I mean we've just cleared a patch of land across here to make new*

> *allotments. It was just derelict land for years and years you know just a dumping ground.* (David, mid 60s, Parish Councillor and local resident, interview)

The intergenerational relationship between growing fruit and vegetables in allotments and gardens is also deemed to be significant. How this tradition has permeated through to life course to younger people through the integration of it into schools. This could help to increase the emotional well-being of younger people too, not solely the older generation.

Rurality – compared to “city-life”

The significance of rurality also emerged from interview discussions with regards to being isolated, the natural environment, and the community relations.

David, below, talks about how the natural environment has improved due to post-industrialisation with the closure of the mines and then goes on to discuss the difference between this rural area and urban areas.

> *Well I mean as far as wellbeing goes just the fact that at one time you had the pit here and pollution from the pit itself. That was just at the bottom of the hill. You had a spoilheap that was burning all the time and fumes and dust and what have you. All the houses were coal-fired so you got a lot of pollution from that, which is all gone now. So it's got to be a more healthy place to live in really that it used to be. There's nothing happens around about it that's going to cause problems. People can get out and walk in the countryside you know. Travel a few mile and play golf or whatever. No I think they've got it pretty good around here compared*

> *to, you know, city-life.* (David, mid 60s, Parish Councillor and local resident, interview)

Place attachment, social capital, the natural environment and rurality were all important findings that emerged from this case study research, as demonstrated above. It can be argued that these place qualities have positively influenced population health and may have mediated against the detrimental effects of economic deprivation, and therefore contributed to 'health resilience'.

Statistical analysis: Factor Analysis, Multiple Correspondence Analysis and Logistic Regression

Whilst there are benefits of conducting an in-depth case study, I cannot argue that these factors are significant in other economically deprived areas due to the place-specific nature of the case study research. Therefore, further statistical analyses using secondary data were conducted in order to investigate whether or not these case study findings apply more widely and if these local findings could be generalised. Three techniques were used: Factor analysis, Multiple Correspondence Analysis and Logistic Regression. Proxies of place attachment, social capital, the natural environment, and rurality were obtained and used to inform the following statistical analysis. ***Chapter 3*** outlines the data and sources used for these analyses.

Local Authority District Results

Factor Analysis (FA)

Prior to conducting factor analysis, pearson's correlations were produced to see if there were statistically significant correlations between the predictor variables

and the dependent variables. Appendix 11 displays a correlation matrix conveying the inter-correlations among the various 'health determinant' variables examined, and how these correlate with the three health variables: NGH, LLTI and DEATHS (defined in ***Chapter 3***). This table shows that all of the determinants of health variables (Social fragmentation, crime, settlement type, living environment, green space, water, and domestic gardens) are statistically significantly correlated with all of the health variables (to either a 0.01 (99%) or 0.05 (95%) significance level). Settlement type has three categories: urban (coded as 1), town and fringe (coded as 2) and rural and dispersed dwellings (coded as 3). ***Chapter 3*** discussed the expected relationships between the 'health determinants' and the health variables whereby better social (greater social capital) and natural environments (more green space, domestic gardens and water) were expected to be related to better health outcomes (so lower morbidity and mortality). On the whole, the directions of the correlations reveal what would be expected. Higher levels of green space, domestic gardens, water surface, and better living environment conditions are associated with lower morbidity and mortality. Rurality (indicated by a positive correlation) is also associated with better health. A higher amount of social fragmentation (less attachment to place and instability) and high levels of crime are positively associated with in higher (worse) morbidity and mortality.

Tables 5.1 and 5.2 display the factor analysis results at LAD level. Table 5.1 shows the total variance of each principal component. The model has identified three components and this three dimensional structure accounts for 75.03% of the total variance. The first component dominated the total variance as it explains half of the variance (42.38%). Table 5.2 shows the factor loadings of

each variable for the four components. Principal component 1 has high morbidity (NGH and LLTI) and mortality, high social fragmentation, low rurality (more urban areas), high amount of crime, high amount of living environment deprivation, fairly low number of domestic gardens, low amount of green space and low amount of water surface cover.

Table 5.1: Factor Analysis Results - Total Variance Explained (LAD, *N*=354)

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.24	42.38	42.38	4.24	42.38	42.38
2	1.74	17.40	59.77	1.74	17.40	59.77
3	1.53	15.26	75.03	1.53	15.26	75.03
4	0.94	9.39	84.42			
5	0.63	6.29	90.71			
6	0.44	4.38	95.09			
7	0.22	2.20	97.29			
8	0.16	1.61	98.90			
9	0.10	1.03	99.94			
10	0.01	0.06	100.00			

Extraction Method: Principal Component Analysis.

Table 5. 2 Factor Analysis variable loadings (LAD, *N*=354)

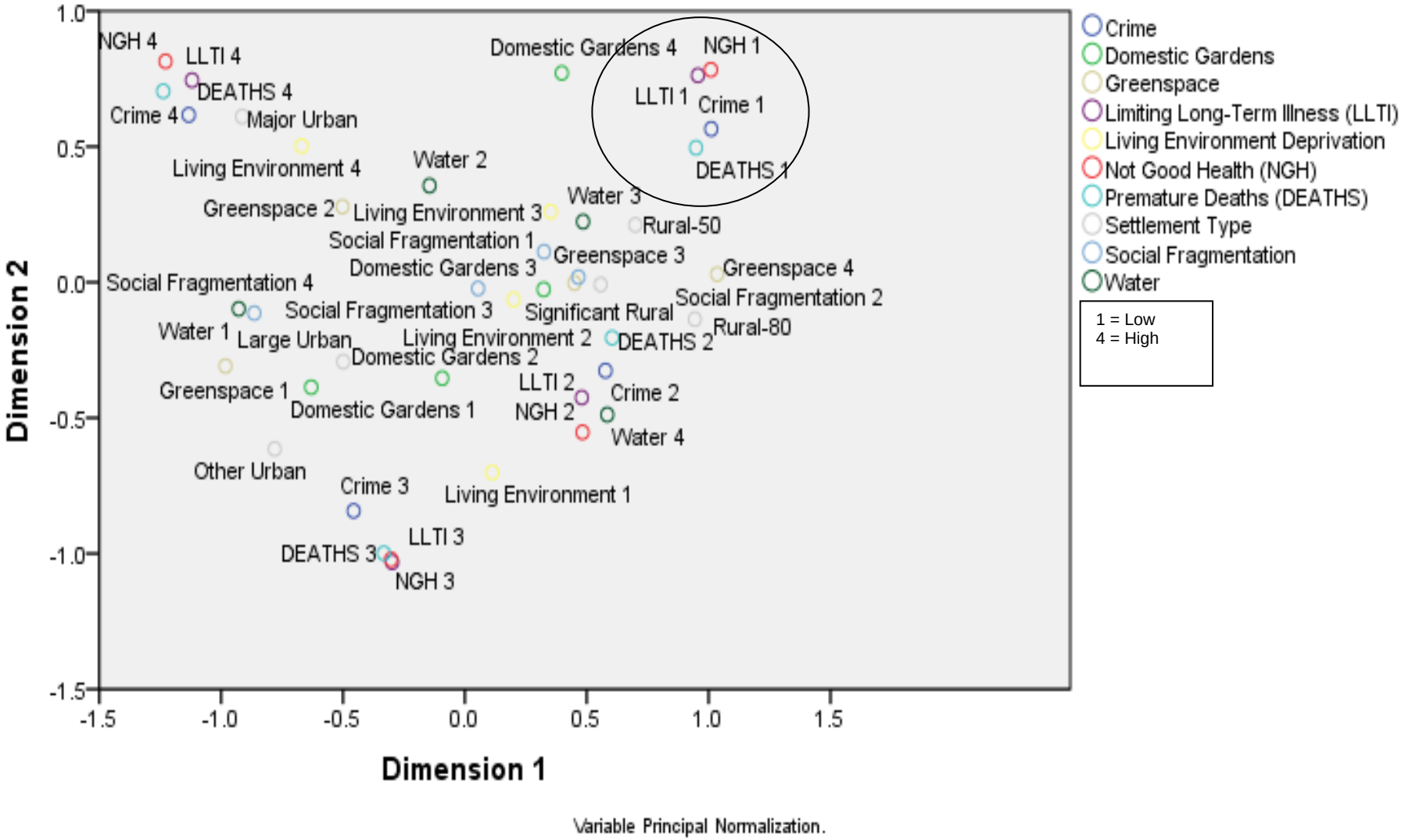
Variables	Component		
	1	2	3
NGH	0.87	0.01	0.46
LLTI	0.81	0.01	0.54
DEATHS	0.89	-0.02	0.35
Social Fragmentation	0.47	-0.15	-0.32
Settlement Type	-0.71	0.16	0.40
Crime	0.74	0.43	-0.22
Living Environment	0.52	0.70	-0.34
Domestic Gardens	-0.11	0.79	-0.24
Green space	-0.61	0.46	0.40
Water	-0.29	0.43	0.51

Extraction Method: Principal Component Analysis.

Multiple Correspondence Analysis (MCA) results

The MCA results are displayed in Figure 5.3. Dimension 1 explains the most variance (49.25%) compared to (28.06%) for dimension 2. The health variables have higher loadings in the first dimension. In dimension 1, crime and settlement type (in terms of high rurality) also have high loadings. This implies that there is a strong association between the health variables and these determinants. None of the predictor variables score highly in dimension 2. Figure 5.3 shows that lower (better) morbidity and mortality (NGH_1, LLTI_1 and DEATHS_1) is clustered in areas that have lower crime, greater rurality, higher amounts of green space and domestic gardens at local authority level. On the other hand, higher morbidity and mortality is clearly clustered in urban areas with higher crime rates and greater living environment deprivation.

Figure 5.3: Multiple Correspondence Analysis Diagram of Health Determinants (LAD)



Census Area Statistical Ward results

FA Results

Appendix 11 displays the correlation matrix showing the inter-correlations among the various variables examined at this finer spatial scale. This table shows that all of the independent variables (Social fragmentation, crime, settlement type, living environment, green space, water, and domestic gardens) at CASWARD level are statistically significantly correlated with all of the dependent health variables (to either a 0.01 (99%) or 0.05 (95%) significance level), which is similar to the pattern for the LAD correlations.

Tables 5.3 and 5.4 display the factor analysis results at CASWARD level. Table 5.3 shows the total variance of each principal component. The model has identified three components and this three dimensional structure accounts for 68.77% of the total variance. Table 5.4 shows the factor loadings of each variable for the three components. The first component dominated the total variance as it explains almost two thirds of the variance (40.82%). Principal component 1 has high morbidity and mortality, fairly high social fragmentation and crime, is more urban, has high living environment deprivation, and low amounts of domestic gardens, green space and water surface cover.

Table 5.3 Factor Analysis Results - Total Variance Explained (CASWARD, *N*=7942)

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.08	40.82	40.82	4.08	40.82	40.82
2	1.51	15.14	55.96	1.51	15.14	55.96
3	1.28	12.81	68.77	1.28	12.81	68.77
4	.99	9.93	78.70			
5	.89	8.90	87.60			
6	.54	5.35	92.95			
7	.29	2.92	95.87			
8	.23	2.32	98.19			
9	.16	1.64	99.82			
10	.02	.18	100.00			

Extraction Method: Principal Component Analysis.

Table 5. 4 Factor Analysis variable loadings (CASWARD, *N*=7942)

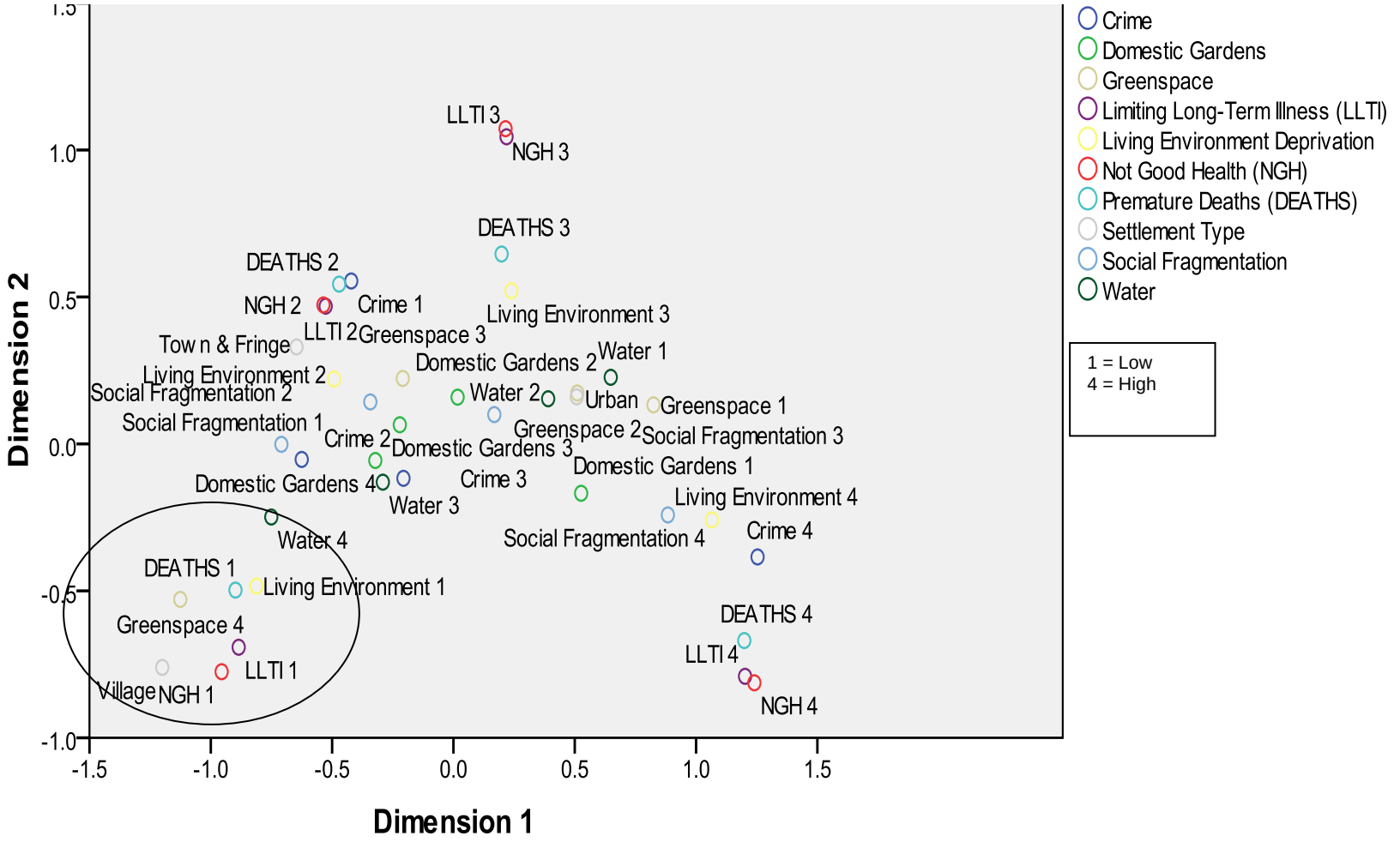
Variables	Component		
	1	2	3
NGH	0.89	0.04	0.31
LLTI	0.85	0.02	0.35
DEATHS	0.85	-0.02	0.27
Social Fragmentation	0.56	-0.06	0.03
Settlement Type	-0.60	0.39	0.46
Crime	0.69	0.50	-0.18
Living Environment	0.60	0.62	-0.39
Domestic Gardens	-0.30	0.60	-0.42
Green space	-0.50	0.51	0.50
Water	-0.13	0.32	0.43

Extraction Method: Principal Component Analysis.

MCA Results

The MCA results are displayed in Figure 5.4. Dimension 1 explains the most variance (48.80%) compared to (22.00%) for dimension 2. The health variables have the highest loadings in dimension 1 and green space, crime, living environment and settlement type have high loadings within this dimension. Figure 5.4 shows that lower (better) morbidity and mortality (NGH_1, LLTI_1 and DEATHS_1) is clearly associated with rural areas (villages, hamlet and isolated dwellings), with higher amounts of green space and better living environments (lower living environment deprivation).

Figure 5.4: Multiple Correspondence Analysis Diagram of Health Determinants (CASWARD)



Variable Principal Normalization.

There is a clear clustering present among these indicators as they neighbour each other on the lower left-hand side of the diagram. Neighbouring this cluster are water (highest category) and domestic gardens (lowest category); however, they have the smallest factor loadings in the MCA. On the right hand side of the diagram, crime and social fragmentation are clustered around the worst health outcomes (NGH_4, LLTI_4 and DEATHS_4). In addition, high living environment deprivation and less space occupied by domestic gardens closely neighbours places with poorer health outcomes.

Lower Super Output Area results

Factor analysis results

Appendix 11 displays a correlation matrix which conveys the inter-correlations among the various variables examined, and how these correlate with the three health variables – NGH, LLTI and DEATHS. This table shows that all of the independent variables (crime, settlement type, living environment, green space, water, and domestic gardens) are statistically significantly correlated with the all of dependent health variables (to either a 0.01 (99%) or 0.05 (95%) significance level). The direction of the correlations reveals what would be expected. Higher levels of green space, domestic gardens, water, and better living environment conditions are correlated with lower morbidity and mortality. A higher amount of crime in an area is associated with the worst health outcomes.

Tables 5.5 and 5.6 display the factor analysis results at LSOA level. Table 5.5 shows the total variance of each principal component. The model has identified three components and this three dimensional structure accounts for 76.47% of the total variance. Table 5.6 shows the factor loadings of each variable for the three components. The first component dominated the total variance as it

explains over half of the variance (42.91%). Principal component 1 has high morbidity and mortality, is more urban, high amount of crime, fairly high living environment deprivation, and low amounts of domestic gardens, green space and water surface cover.

Table 5.5: Factor Analysis Results - Total Variance Explained (LSOA, *N*=1656)

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.87	42.91	42.91	3.87	42.91	42.91
2	1.92	21.30	64.21	1.91	21.30	64.21
3	1.10	12.26	76.47	1.10	12.26	76.47
4	.70	7.75	84.22			
5	.45	5.01	89.23			
6	.41	4.59	93.82			
7	.30	3.32	97.14			
8	.22	2.48	99.62			
9	.03	.38	100.00			

Extraction Method: Principal Component Analysis.

Table 5. 6 Factor Analysis variable loadings (LSOA, *N*=1656)

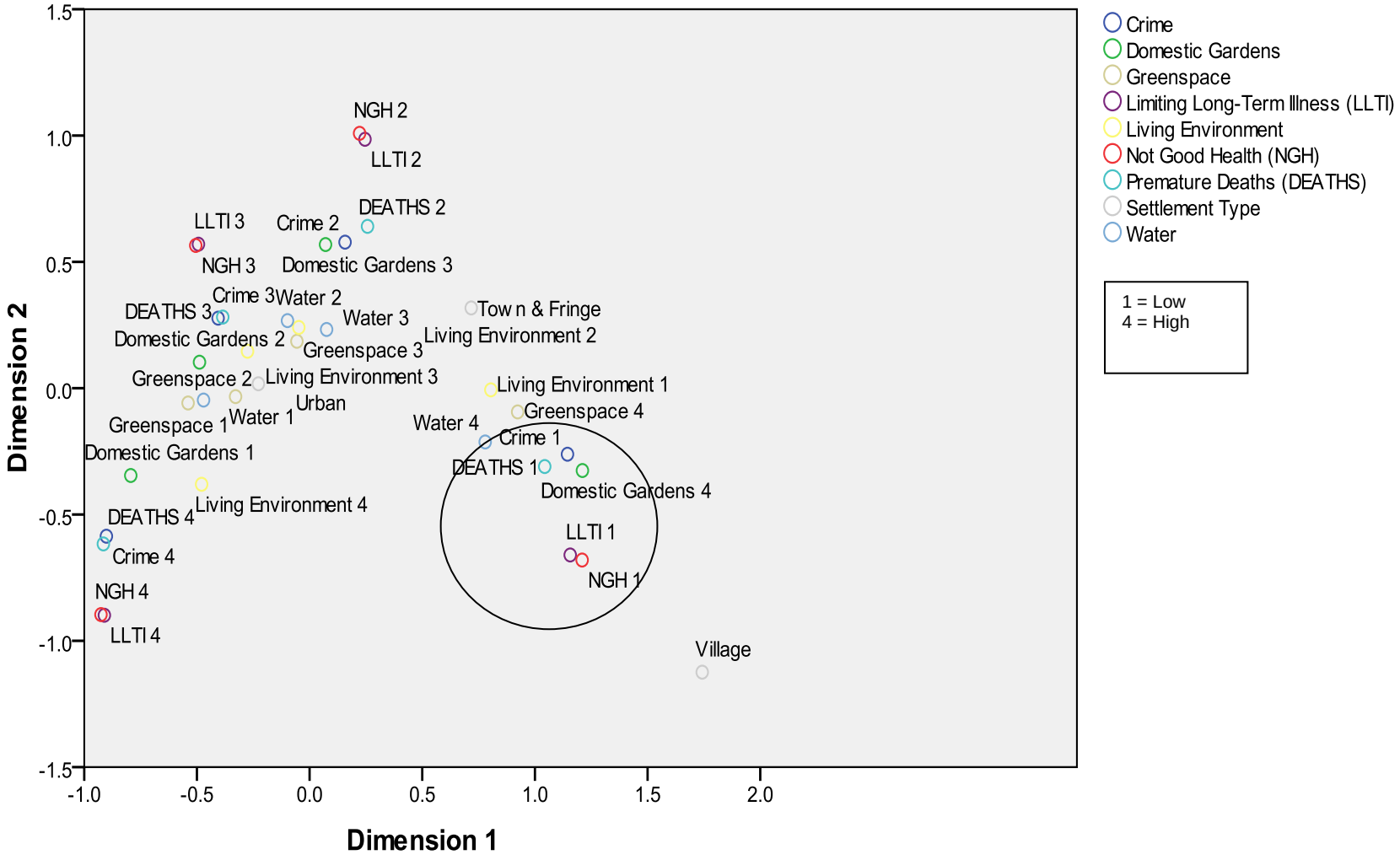
Variables	Component		
	1	2	3
NGH	0.81	0.38	0.36
LLTI	0.80	0.39	0.38
DEATHS	0.73	0.36	0.10
Settlement Type	-0.53	0.47	0.32
Crime	0.79	0.07	-0.25
Living Environment	0.34	0.37	-0.73
Domestic Gardens	-0.77	0.18	0.26
Green space	-0.50	0.75	-0.14
Water	-0.41	0.73	-0.18

Extraction Method: Principal Component Analysis.

MCA results

The MCA results are displayed in Figure 5.5. Dimension 1 explains the most variance (40.40%) compared to (20.50%) for dimension 2. The health variables have high loadings in the first dimension and domestic gardens and crime have high loadings within this dimension. Figure 5.5 shows that lower (better) morbidity and mortality (NGH_1, LLTI_1 and DEATHS_1) are associated with lower crime, less space occupied by domestic gardens, higher amounts of green space and water surface cover and better living environments (lower living environment deprivation). There is a less clear pattern between settlement type and health.

Figure 5.5: Multiple Correspondence Analysis Diagram of Health Determinants (LSOA)



Variable Principal Normalization.

Logistic Regression: 'resilient' versus 'not resilient'

While the above analyses are helpful in giving an indication of mechanisms that may be operating in areas to produce positive health outcomes, the above analyses does not directly compare 'resilient' versus 'not resilient' areas (since there are small numbers of 'resilient' areas, particularly at LAD level, so this would lack statistical power). Given these limitations, I am unable to argue that the indicators found to be positively associated for health are also associated with 'health resilience'

To address the above limitations, Logistic Regression (LR) analyses were conducted, which solely included persistently deprived areas (over four decades (1971-2001) in the fifth most deprived quintile (*N*=1101). However, this could only be carried out at CASWARD level as the number of 'resilient' areas at LAD or LSOA is too small to be statistically powerful. Moreover, it is not possible to examine persistent deprivation at LSOA level, since these areal units were only established in 2001. I used the LR technique to compare place attachment, social capital and natural environment predictor variables againstst economically deprived 'resilient' and not 'resilient' wards. The purpose of using this statistical method was to find out whether or not these factors that were identified as protective in the case study also predicted 'health resilience' in the other deprived 'health resilient' areas.

I ran LR models using as dependent variables each of the three health indicators: not good health, limiting long-term illness and premature deaths. These dependent variables were coded as: '0' if 'not health resilient' and '1' if 'health resilient'. The predictor variables that were examined included social

fragmentation, domestic gardens, green space, water, crime, and living environment deprivation (the same as those use in the previous FA & MCA analysis). Settlement type (urban/rural classification) was not included in the analysis presented here as there was an urban bias in the 'health resilient' areas found in this study so it was decided that this variable would not be helpful as it would be skewed towards urban areas; however other analyses that did include this variable showed that settlement type did not predict 'health resilience', as will shortly be discussed. First, I standardised all of the predictor variables into z scores to help to adjust for the fact that some variables may be skewed in their distribution (as the programme assumes they are normally distributed) and this should also make for more comparable b coefficients. Table 5.7 to 5.9 show the results for not good health, limiting long-term illness and premature deaths respectively. The results reveal some unexpected findings.

Interpretation of results

The second column, B, shows the log odds unit. For every unit change in the predictor variable we expect either an increase or decrease (positive or negative value) in the log odds. The third column shows whether or not the predictor variable is statistically significant. If the p-value is below 0.05 then this indicates that particular variable is statistically significant in this model (controlling for all of the other variables). The Exp(B) column shows the relative odds (otherwise known as odds ratio) for each variable. Finally, the last two columns show the lower and upper confidence intervals (CI) for the odds ratio, which relates to probability. So in 95% of cases you could be confident that the

parametric (population) coefficients would lie between the upper and lower CI bounds.

Results

Firstly, each predictor variable was examined separately in relation to each of the health outcomes before multiple logistic regression was performed. Secondly, interaction effects are also examined given some of the unexpected findings.

Separate analyses

NGH results

Only social fragmentation, domestic gardens and green space were statistically significant ($p<0.005$) and therefore predictive of resilience in NGH. Social fragmentation ($\beta=1.372$, $p=0.000$) was positively associated with resilience in NGH so for every unit increase in social fragmentation and unit increase in resilience. This is unexpected given prior theorisation that lower social fragmentation would contribute to areas having better health outcomes (resilience). Domestic gardens ($\beta=-1.909$, $p=0.000$) and green space ($\beta=-7.628$, $p=0.000$) were negatively associated with resilience in NGH, thus for every unit increase in these variables contributed to a unit decrease in resilience. Again, this conveys an unexpected relationship; it was hypothesised that areas with more domestic gardens and greater amount of green space might help to explain findings of ‘health resilience’.

LLTI results

All of the explanatory variables, except water, living environment deprivation and settlement type, were statistically significant ($p<0.005$) and therefore predictive of resilience in NGH. Social fragmentation ($\beta=1.499$, $p=0.000$) was positively associated with resilience in NGH so for every unit increase in social fragmentation there is a unit increase in resilience. Similar to NGH results above, this is unexpected given prior theorisation that lower social fragmentation would contribute to areas having better health outcomes (resilience). On the other hand, crime ($\beta=-0.417$, $p=0.011$) was negatively associated with resilience (as expected). Lastly, Domestic gardens ($\beta=-1.766$, $p=0.000$) and green space ($\beta=-2.471$, $p=0.000$) were negatively associated with resilience in NGH, thus for every unit increase in resilience a unit decrease in resilience. Again, this conveys an unexpected relationship since it was hypothesised that areas with more domestic gardens, greater amount of green space and water surface area might help to explain findings of ‘health resilience’.

DEATHS Results

Only social fragmentation and domestic gardens were statistically significant and predictive of resilience in DEATHS. Social fragmentation ($\beta=0.879$, $p=0.000$) was positively associated with resilience so for every unit increase in social fragmentation and unit increase in resilience in DEATHS. Domestic gardens ($\beta=-1.265$, $p=0.000$) was negatively associated with resilience, thus for every unit increase in domestic gardens there is a unit decrease in resilience. Therefore, neither of these associations were in the predicted direction.

Multiple Logistic Regression Results

NGH Results

The results displayed in Table 5.7 also show somewhat unexpected findings. With the exception of crime, the other predictor variables appear to be inversely associated with 'health resilience'.

Table 5.7: Logistic Regression Results (Notgood health, *N*=1101)

Predictor Variables	B	Sig.	Exp(B)	95% C.I.	
				Lower	Upper
Social Fragmentation	1.132	.000*	3.103	2.321	4.150
Domestic Gardens	-.486	.103	.615	.343	1.103
Green space	-2.852	.007	.058	.007	.464
Water	-.146	.668	.864	.444	1.682
Crime	-.930	.000*	.395	.244	.638
Living Environment Deprivation	.869	.000*	2.384	1.549	3.667
Constant	-4.456	.000*	.012	-	-

*statistically significant to a 95% level

Table 5.8: Logistic Regression Results (Limiting long-term illness,*N*=1101)

Predictor Variables	B	Sig.	Exp(B)	95% C.I.	
				Lower	Upper
Social Fragmentation	1.433	.000*	4.192	3.077	5.710
Domestic Gardens	-.461	.098	.631	.366	1.088
Green space	.039	.898	1.040	.571	1.892
Water	-.228	.503	.796	.409	1.551
Crime	-1.335	.000*	.263	.155	.447
Living Environment Deprivation	1.097	.000*	2.996	1.973	4.549
Constant	-3.721	.000*	.024	-	-

*statistically significant to a 95% level

Table 5.9: Logistic Regression Results (Premature deaths, *N*=1101)

Predictor Variables	B	Sig.	Exp(B)	95% C.I.	
				Lower	Upper
Social Fragmentation	.727	.000*	2.069	1.561	2.742
Domestic Gardens	-.651	.018*	.521	.304	.896
Green space	.250	.134	1.284	.926	1.782
Water	-.897	.253	.408	.087	1.901
Crime	-.765	.004*	.466	.278	.781
Living Environment Deprivation	.766	.001*	2.150	1.393	3.319
Constant	-3.482	.000*	.031	-	-

*statistically significant to a 95% level

As the log odds for social fragmentation and living environment deprivation increases so do the log odds of being 'health resilient' in not good health. Based on the case study findings, I would expect this association to be the other way round. Conversely, the other predictor variables, including domestic gardens, green space and water surface, show the opposite association. An increase in these variables results in a decrease in 'health resilience'. Crime is the only variable that shows an expected association. An increase in crime is associated with a decrease in 'health resilience'. Only the associations between social fragmentation, domestic gardens, crime and living environment deprivation and 'health resilience' are statistically significant in this model.

LLTI Results

Table 5.8 shows the results for predicting 'health resilience' in limiting long-term illness. Again, the results from this model reveal similar patterns, except for green space. As the log odds for social fragmentation, green space and living environment deprivation increases so do the log odds of being 'health resilient'

in limiting long-term illness. On the other hand, increases in domestic gardens, water surface and crime results in a decrease in 'health resilience'. Similarly, the direction of association for crime is as what would be expected. Only the associations between social fragmentation, crime and living environment deprivation are statistically significant in this model.

DEATHS Results

Lastly, Table 5.9 displays the results for predicting 'health resilience' in premature deaths. The results show exactly the same associations as limiting long-term illness and statistical significance. The association between domestic gardens and 'health resilience' is also statistically significant in this last model.

Interaction effects

Further analyses were subsequently conducted since there were some unexpected results (e.g. high social fragmentation predicting 'health resilience') which is believed to be due to a 'London effect' (discussed in ***Chapter 4***) whereby some of the variables are strongly associated with London and given most of the resilient CASWARDs are located in London it would make sense that there are interaction effects that may be producing some of the unexpected findings. Also, the settlement (urban/rural classification) type variable did not predict resilience (perhaps due to rather small numbers of areas in some categories of settlement, but more particularly because the crucial differences in likelihood of resilience seem to relate to whether or not the area is located in London). I therefore replaced the settlement type variable with a binary variable that distinguishes between areas in the London region and those in other parts of England.

Three LR models were produced for each of the health outcomes (NGH, LLTI and DEATHS). The dependent variable was resilience (1=Resilient; 0=Not resilient) in the health outcomes. In model 1, I included London only in the binary logistic regressions and examined the associations between London and resilience in all of the health outcomes. In model 2 I also included the other predictor variables (social fragmentation, domestic gardens, green space, water surface area and crime) and examined associations between these predictors and resilience in all of the health outcomes. Lastly, in model 3 I included London interaction terms for those variables introduced in model 2 that showed a significant relationship to the outcome variable.

Model 1

As expected, the separate binary logistic regressions revealed that London was predictive of ‘health resilience’ for all three health outcomes ($p<0.001$) – Tables not shown. In the following section models 2 and 3 are discussed and broken down by each health outcome.

Models 2 & 3

NGH Results

The results from model 2 for NGH shown in Table 1 (Appendix 12) reveal that social fragmentation, crime and London are statistically significant. Social fragmentation and London are positively associated with resilience and crime is negatively associated with resilience in NGH. This shows that regardless of where the area is located, social fragmentation increases the amount of resilience in NGH. Similarly, regardless of location of area, increases in crime decreases resilience in NGH. Areas in London still have higher resilience in

NGH even after controlling for all of the other predictor variables in the model. Given this ‘London effect’ the next model considered interaction effects between London and the above predictor variables that were found to be statistically significant for resilience in NGH (social fragmentation and crime). The results from model 3 displayed in Table 2 (Appendix 12) reveal that if the area is located in London the effect of social fragmentation on resilience in NGH is higher. There was no significant interaction effect between London and crime in this model.

LLTI Results

The results from model 2 for LLTI are displayed in Table 3 (Appendix 12). These results show that social fragmentation, green space, crime and London are statistically significant. Social fragmentation, green space and London are positively associated with resilience whereas crime is negatively associated with resilience in LLTI. Like the NGH results above, this shows that regardless of where the area is located, social fragmentation increases the amount of resilience in LLTI. Similarly, regardless of location of area, increases in crime decreases resilience in LLTI. Areas in London still have higher resilience in LLTI even after controlling for all of the other predictor variables in the model. Green space is also significantly associated with resilience in LLTI regardless of where the area is located (higher amounts of green space in an area is predictive of health resilience). Interaction effects were explored in model 3 between London and these significant predictor variables (social fragmentation, green space and crime) and are shown in Table 4 (Appendix 12). The results from this model reveal that there are significant interaction effects between London and social fragmentation only. If the area is located in London the effect of social

fragmentation on resilience in LLTI is therefore higher compared to living elsewhere. Again, there was no significant interaction effect between London and crime in this model or between London and green space, which shows that area of residence does not influence the significant associations between these predictor variables and resilience in LLTI.

DEATHS Results

The results from model 2 in DEATHS are similar to the LLTI results above whereby social fragmentation, green space, crime and London are statistically significant (Table 5, Appendix 12). Social fragmentation, green space and London are positively associated with resilience whereas crime is negatively associated with resilience in LLTI. Like the LLTI results above, this shows that regardless of where the area is located, social fragmentation increases the amount of resilience in DEATHS. Similarly, regardless of location, increases in crime decreases resilience in DEATHS. Areas in London still have higher resilience in DEATHS even after controlling for all of the other predictor variables in the model. In addition, green space is also predictive of resilience in LLTI (higher amount of green space in an area is predictive of health resilience). The interaction model 3 (Table 6, Appendix 12) shows that both social fragmentation and crime significantly interact with London. Therefore, areas located in London have increased effects of social fragmentation on resilience in DEATHS. There is also a significant negative association between crime and resilience in areas which are located in London.

These results reveal two important associations. Firstly, it seems that there are consistent interaction effects between London and social fragmentation for all

three health outcomes which may explain the unexpected associations between social fragmentation and 'health resilience' as well as an interaction effect between London and crime in the DEATHS model only.

As previously discussed in ***Chapter 4***, this 'London effect' was first discovered in Doran *et al*.'s study (2006) and they discuss various reasons for this genuine overachievement in health in Inner London (they examined life expectancy as opposed to premature mortality although these similar measures of health so the same reasons may apply) including the concentration of financial and cultural resources in the capital, which may help to explain why London is predictive of greater resilience in all three health outcomes compared to resilience in other parts of the country. The interaction effects between London and crime (in the case of LLTI and DEATHS only) are not surprising considering the measure of social fragmentation includes high population turnover and private renting, which are much greater in London. Additionally, crime is considered to be much higher in London so again this increased effect of crime when the area is in London is understandable. The lack of interaction effect between London and green space is also unsurprising given the limited amount of green space especially in Inner London.

Discussion

The findings from the case study and the FA and MCA statistical analyses mutually reinforce each other. However, the LR analysis that directly compared resilient and not-resilient economically deprived areas (at ward level only), showed that not all the variables representing health determinants had the expected associations with health outcomes in statistical analyses, although

there seemed to be a consistent link between greater 'health resilience' and lower crime levels, which seemed consistent with the literature reviewed in ***Chapter 2*** and ***Chapter 3***. In the following discussion I examine each of the protective factors for 'health resilience' that were found to be significant in the case study and triangulate these with the statistical analysis results.

Place attachment and social capital

Place attachment was a significant finding that emerged from the case study. It was difficult to capture this in the statistical analysis, since indicators on place attachment are not routinely asked in surveys and when they are only a sample of areas are included, thus it is extremely difficult to obtain comprehensive measures of place attachment. Moreover, the scale at which it is examined (usually regionally) is too large to be included in this analysis. Therefore, social fragmentation was used as a proxy of both place attachment and social capital.

The FA and MCA results showed that lower social fragmentation and crime tended to be associated with better health outcomes (lower not good health, limiting long-term illness and premature deaths) at all three spatial scales examined. The qualitative findings also suggest that social capital (inversely measured by social fragmentation and crime) was strong in the case study (albeit certain forms of social capital).

The LR analysis does not fully correspond to these findings when directly comparing economically deprived yet 'health resilient' areas against other 'not health resilient' areas as higher social fragmentation predicted 'health resilience' (unexpectedly). However, the association between crime and 'health resilience' was more intuitive given that lower crime predicted 'health resilience'. It could

be the case that the measure of social fragmentation is not a good proxy of social capital, or may be due to the interaction effects between the London variable and social fragmentation since they are both positively correlated, which is unsurprising given the high population turn over in Inner London. It might also be due to the fact that the high number of 'health resilient' areas identified by the regression tree classification, in ***Chapter 4,*** was largely found to be urban, although this was not found to be predictive of 'health resilience' in the LR.

Natural environment and rurality

The protective role of natural environments for health found in the case study was also mirrored by the FA and MCA results. Better health outcomes were clustered in areas with more green space, domestic gardens, water surface, and lower living environment deprivation. There also appeared to be a rural dimension to these findings as better health (lower morbidity and mortality) was located in rural areas compared to urban ones. This was mentioned in the case study with regards to the natural environment, which was compared to more urban settings such as 'city-life'.

Again the LR analysis did not show that the natural environment positively impacted on 'health resilience', which showed inverse relationships between green space, domestic gardens, water surface and living environment in some of the earlier LR analyses. However, these were weak associations because they were not statistically significant in the models. Furthermore, when other predictor variables were controlled for in the latter LR models, green space was

a significant predictor of 'health resilience' (higher amounts of green space predicted resilience) for two health outcomes: LLTI and DEATHS.

Limitations

The results have to be considered in light of limitations. Firstly, the statistical analysis cannot differentiate between different forms of social capital, such as bonding and bridging. As I have already discussed these may have both positive and negative effects for health and may have differential influences on health as they do not capture the same thing. Social capital therefore needs to be considered carefully and not simply as protective for health. In the following chapter I go on to discuss this point further.

Secondly, the indicator used for green space only measures quantity not quality. There may therefore be large areas of green space that are unused due to poor quality, and perhaps not feeling safe. Thirdly, there is an uneven distribution of 'health resilience' mainly concentrated in urban areas, which may have impacted on the LR analysis.

Due to some of the study limitations I cannot claim transferability of the resources for 'health resilience' identified in the qualitative case study, certainly not for urban (particularly London) areas. It could be argued that the resources identified in Chevington may only be applicable to other economically deprived semi-rural/rural settings. Based on the fact that semi-rural/rural areas represent a minority of 'health resilient' areas identified in this study, there is most definitely a need to explore why this may be the case. It nonetheless reinforces the uniqueness of Chevington as it was among the minority of 'health resilient' areas.

The case study research was exploratory rather than definitive and it is clear that future comparative case research into different resilient areas is required to more fully identify common mechanisms underlying 'health resilience'. The findings do, however, complement previous qualitative case study findings conducted in diverse regional settings, since Mitchell et al (2009) found that community cohesion (founded by a common industrial heritage) and supportive social networks were among the strongest findings to emerge from the various case studies. Some participants also referred to the quality of the physical environment, in terms access to natural environments such as countryside.

Chapter 6

"Off the map": Risk-resilience continuum

Chapter 5 discussed the first set of case study findings, which reflected on some of the positive features of the locality that may be argued to be somewhat protective in the parish of Chevington and be able to provide resources for 'health resilience' and weaken the effects of economic deprivation. Conversely, this chapter now considers some of the potential risks for obtaining (and sustaining) 'health resilience' that may be detrimental for health outcomes and possibly counteract some of the positive effects of the aforementioned resources and protective mechanisms.

Several aspects of the locality emerged as potential risks for 'health resilience' in the research including poor public services and amenities (particularly poor public transport, availability of local affordable supermarkets, the quality of healthcare, lack of leisure and recreational facilities), lack of employment opportunities, migration and housing regeneration-associated issues. Residents feeling *"off the map"* and the *"forgotten about people"* within Castle Morpeth is significant.

Wilkinson's relative inequality hypothesis (1999) discourse and the collective resources/local social inequality models (Stafford and Marmot, 2003) pervades through some of these problematic and potentially health-damaging aspects of

the locality, which will be considered in this section. Rurality is also another key issue that underlies some of the problems experienced in the locality. Lastly, the construction of the 'other' is also something that will be discussed in relation to the community, social capital and the potential difficulties for integration in tight-knit *Gemeinshaft* social relations. Each of these discourses will be discussed in light of the empirical findings. The underlying argument of this chapter is that resilience and risk go hand-in-hand and they are not polar opposites; rather they are on a continuum. The risky factors that will be explored in this chapter may present challenges for the future and sustainability of 'health resilience' in this particular locality. The psycho-social model is then returned to at the end of this chapter in order to make sense of the findings.

Poor local services

> We all know the problems of our poorest neighbourhoods – decaying housing, unemployment, street crime and drugs. People who can, move out. Nightmare neighbours move in. Shops, banks and other vital services close.
>
> Foreword by Tony Blair, Former Prime Minister in a report by the Social Exclusion Unit (1998, p. 7)

Writing over a decade and a half ago about the compounded social problems of living in a disadvantaged area, Blair identifies problems commonly associated with high levels of area deprivation. Still these issues remain widespread despite attempts at neighbourhood regeneration and area-based initiatives

(ABIs)[10]. ABIs have been argued to be 'highly effective in transforming areas of high deprivation and improving the life chances of communities not able to access mainstream funding and services' (Home Office Community Cohesion Unit, 2004, p.5). However, these problems associated with socio-economic deprivation are not always necessarily experienced the same across all deprived areas, and in some instances grouping deprived areas into the same category can be misleading. As I have already shown in ***Chapter 4*** and ***Chapter 5***, some deprived areas may actually have beneficial aspects of their locality that may go unnoticed with such a broad-brush thinking about deprived areas.

Despite identifying positive features of the locality in the case study, there were several issues that were raised on numerous occasions, including poor local facilities, infrastructure and public services. These included dissatisfaction and frustration with local public transport, poor local amenities including not having an affordable supermarket close-by, a lack of youth facilities, funding cuts to the Sure Start centre, long waiting times at the local healthcare centre, and the decisions to close down the local police station and Druridge Bay middle school.

It is a well-known fact that deprived areas often have poorer services and, what is even more disturbing, some studies have found that there are also lower expectations of services in poorer areas (Duffy, 2000). Duffy claims that lower expectations of public services may be due to 'less demanding benchmarks against which to judge service provision' (p.5). The issue of having poor public services certainly resonates with some of the findings from the case study,

[10] Area Based Initiatives (ABIs) have become increasingly popular since the New Labour Government was elected in 1997. These ABIs extend beyond the traditional focus on disadvantage in either urban or inner city areas (Smith, 1999).

demonstrated below. The research did not suggest that the neighbourhood had lower expectations of the services. In fact, many of them had protested against some of these services and tensions were widespread on many occasions through petitions and public consultation meetings. However, this may have been the case for those residents that did not feel that the services were problematic (which only accounted for a minority of participants in the research).

Public transport

Firstly, public transport was found to be a real issue for local residents with its slow and infrequent hourly bus service, especially in relation to lack of mobility and difficulty doing shopping outside of the local vicinity. This is due to the expensive prices in the Co-op or having to get to doctor appointments in the Amble surgery in a nearby town.

Below one of the residents talks of the high level of frustration and frequent complaints related to the poor bus services in the neighbourhood:

> *The bus service isn't anything spectacular you know. I know we've got free bus passes but I think there's times we'd struggle to get where we want to without a car* [...] *We often get complaints about the bus service round here by the older people who depend on it really.* (David, mid 60s, local resident & member of Parish Council Committee, interview)

The limited bus service was also an issue with restricted choice in terms of destination:

> *No buses come down here except the Ashington bus.*
>
> (Betty, early 70s, local resident, focus group)

> *The 518 doesn't come down here. That's the Newcastle bus.*
>
> (Robert, early 70s, local resident, focus group)

Moreover, the attempts that some residents have gone to in order to get away for the day just reinforces how poor the bus services are with having to resort to paying for a taxi to take them to the nearest bus stop as it is about a mile away from where they live.

> *What I did a fortnight ago, we wanted to go to Morpeth - it was a lovely day mind. So we got a taxi to the top of the road. It cost you £2 like to go to the top of the road then we got the bus to the top of the road. But the transport is very very poor. It always has been.*
>
> (Tim, mid 80s, Local residents, Interview)

Despite these commonly felt frustrations among the community, public transport remains poor. Buses are also the only means of transport in the local area, with no railway station. The closest railway station is based at Acklington (approximately 3 miles away). Therefore, there is a heavy reliance on buses and given the rural and isolated location, unless the residents have a car, it is immensely difficult to get on with everyday necessities. As a result, many of the residents expressed concern for living in the area without a car and that they would feel restricted without one. Daniel equates not having a car with a *"disability"* and Rachel says that *"I wouldn't live here if I didn't have the car I must admit"*. A couple of local residents, Shirley and Pauline, told me how they got some of the residents together and tried to set up a petition to get a better service, but this went unnoticed. Therefore, despite attempts to improve the service mobilised by the community the service continues to be poor.

Access to supermarkets

Similarly not having access to a reasonably-priced local supermarket was also a serious problem and the majority of residents interviewed talked frustratingly about the monopoly held by the local Co-operative convenience store (as it is the only food store in the locality):

> *I only use them if I’ve got to ‘cos the prices in that Co-op. I mean old people here, I don't know how they cope ‘cos they've got no transport or people to go shopping for them […] It's not a care & share Co-op because somebody rang up and complained because if you go to Amble, the Co-op in Amble, is cheaper than the Co-op here but they said it's because they are graded/banded because we're more rural and it's wrong because they know that you've got to shop there.*
>
> (Christine, mid 40s, Community centre caretaker & local resident, interview)
>
> *I have challenged the Co-op on this several times and I get told that prices are worked out on the square foot of the shop. . But you can go to the tiny Co-op in Amble that is down by the caravan park and you know you can’t swing a cat in it but the prices are cheaper than this Co-op so I don’t believe the square foot story.*
>
> (Michael, late 20s, community centre project lead & local Parish Councillor, interview)
>
> *You know the Co-op it's supposed to be for working class people [...] You want a bank loan to go over there!*
>
> (Mick, late 70s, local resident, interview)

This resonates with Macintyre *et al*.'s (2002) discourse around the impact of material resources, also described as 'opportunity structures', on residents' health and how local (un)availability of affordable and nutritious food can be damaging for those individuals that are less mobile and not able to access supermarkets outside of the local parameters of the area.

The 'collective resources' model developed by Stafford and Marmot (2003) also has some relevance here in terms of more affluent areas having more collective resources, such as a choice of supermarkets, and the detrimental effect this has on those living in deprived areas by comparison. This model goes on to argue that poorer individuals living in more affluent areas may be either positively affected by the availability of more collective resources or they may also be negatively affected as they may be less able to purchase or use such goods and services. The latter has been named the 'local social inequality' model. Chevington does not entirely fit into either model, since Stafford and Marmot (ibid.) discuss the impacts of health for poorer or richer people living *within* deprived areas. I argue that because Chevington is situated by more affluent areas that have more amenities and services, this *between*-area comparison has a detrimental impact on population health via the psycho-social model of health inequalities.

As seen in the above quotations by Christine and Mick, they negatively compare Chevington's lack of amenities with those in a neighbouring town, expressing the inequality they feel since they are "more rural" and as such there is a greater need to have a reasonably priced supermarket for less mobile local

residents (either due to mobility problems or not having a car). To a certain extent this also relates to the local social inequality model whereby people living in deprived areas, surrounded by more affluent areas with more collective resources, has negative implications for the health. However, again this model discusses the negative effects of this relationship within areas and not comparison with neighbouring areas but I feel this model can be extended.

Other studies have examined the effects of expensive supermarkets in deprived areas and how these may negatively impact on health (Cummins and Macintyre, 2006). The metaphor *food desert* is a term that has been developed in the 1990s to describe usually urban areas where residents are unable to access affordable and healthy diets (Cummins and Macintyre, 2002). However, these authors argue that this concept is a 'factoid'; it is believed to be the case that there are food deserts but there is not much evidence to support this claim. Whilst the majority of studies that have examined food deserts have done so in largely urban areas, this research shows that there may well be *deserts* in rural areas, certainly if this term takes into account size of shop (Pichaud and Webb, 1996) since smaller shops are usually more expensive.

The issue of rurality is therefore apparent here. As ***Chapter 5*** discussed, rurality can be protective for residents as it invokes a sense of closeness and insularity. It is also in line with the 'rural idyll', whereby the *Geimeinschaft* type of community relations exists. However, in this instance being remote is a negative aspect of the locality in relation to availability of affordable nutritious food, since the Co-operative (Co-op) store is graded according to location and level of competition. To put it into context, there are many supermarkets in a

neighbouring town, Amble, including a Co-op store and due to this competition the store has to be more competitive with its prices to attract customers, whereas in Hadston the Co-op is the only food store (note the deliberate decision not to use the term supermarket) within a 4 mile radius. Thus, without frequent and reliable public transport or access to a car, shopping at the expensive Co-op convenience store is the only option for less mobile groups (particularly older and more disadvantaged groups).

Healthcare centre

Mixed views and experiences emerged from the research in relation to the local healthcare centre based in Hadston. Some residents talked about the good quality service in the centre, such as Louise in the following quotation:

> *This is actually a good practice. They will try to see you and they offer quite a good service. If you really need to get in they will push you in. It's still got quite a little community feel about it. And I don't know whether that's because the receptionists are local people so they know the families and they know the person. So they do try to push them in.* (Louise, late 40s, local resident, focus group)

Whereas others talked disparagingly about the long waiting times and quality of service provided by the centre, such as Daniel in the quotation below.

> *I think the waiting times and the service could be improved. We went there with Molly, who had a cold, and we had to wait 45 minutes for a doctor and then the doctor said that he was going to be another 45 minutes so we had to come back another day, which we found was a bit poor. I think there could be better communication between the doctors*

and the reception in what is available as far as the timeslots for the doctors. (Daniel, late 30s, local resident, interview)

The main frustration that was shared by the local residents was that it is often difficult to get an appointment, as Laura and Anne describe in the following:

The only thing I would say is that it's hard to get appointments when you need one but that's obviously with any surgery I think.

(Laura, early 30s, local resident, interview)

Sometimes you're waiting a week and a half for an appointment.

(Anne, mid 50s, local resident, focus group)

Some of the residents that I interviewed used the Amble healthcare centre instead (as they part of the same branch). This was mainly the case for those residents that had previously lived at Amble but moved to Hadston so they wanted to keep their doctor. Nobody that took part in the research said that they were registered at this other practice due to the level of quality or service experienced at the Hadston branch; rather they had decided to stick to what they knew and not change when they moved.

Studies have found that quality of healthcare is lower in deprived areas throughout Britain. For instance, Wright et al (2006) examined the association between Quality of Outcomes Framework[11] (QOF) scores and deprivation. They found that multiple deprivation was inversely associated with QOF scores, with

[11] The Quality Outcomes Framework operates on an annual basis which examines GP achievement. It is described as a reward and incentive programme at: http://www.ic.nhs.uk/statistics-and-data-collections/audits-and-performance/the-quality-and-outcomes-framework [Last accessed 11/07/2012]. It scores on the following points: (1) how well organised the GP surgery is; (2) how it manages common chronic diseases (including asthma and diabetes); (3) what patients views are of the surgery; and (4) the number of extra services offered at the surgery.

the difference between the most and least deprived areas resulting in a 11% reduction in QOF scores. This may be due to the higher demands placed on primary care in these areas. However, the findings from this research are ambiguous as there is no consensus regarding quality of primary health care delivered by the healthcare centre in the locality.

Table 6.1 shows the most recent published QOF scores (2010 - 2011) for the GP practice in the locality. Totals are shown for both overall achievement and the individual domain scores. The figures show that the practice performs above the English average on all scores.

Table 6.1: Quality Outcomes Framework Results (2010-2011)

TOTAL ACHIEVEMENT:

Percentage of total achievement points	10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
Total Achieved Results	95.5% 954.54 out of 1,000.0 points: 0.8 percentage points below PCT Average, 0.8 above England

DOMAIN TOTALS:

Clinical Results	96.9% 675.26 out of 697.0 points: 1.1 percentage points below PCT Average, 0.1 above England
Organisational Results	98.2% 164.50 out of 167.5 points: same as PCT Average, 0.8 above England
Patient Experience Results	77.4% 70.78 out of 91.5 points: 1.5 percentage points below PCT Average, 4.8 above England
Additional Services Results	100.0% All the 44.0 points: 1.9 percentage points above PCT Average, 2.9 above England

However, when compared to other practices within the wider Primary Care Trust (PCT) in which it falls, comparatively the practice does worse by 0.8% on the total achievement score and 1.5% for patient experience. However, it scores the same at the PCT average for organisational results and better than the PCT average (by 1.9%) for additional services offered.

Therefore, this says something about how the practice performs relative to other practices within the same PCT and in two domains it clearly has lower performance. Nonetheless, in terms of how the practice performs relative to the national (English) average it scores higher. A cursory look at previous years QOF scores shows similar patterns. Appendix 14 shows a more detailed breakdown of the groups within each domain (clinical, organisational, patient experience and additional services). The patient survey results within the patient experience grouping in Appendix 14 shows that in fact the survey results are 2.5% below the PCT average, however still better than the English average (by 6.8%). Therefore, on the whole these results show that statistically the practice is performing well relative to the national average but the situation is different when examined within the local context (PCT) in which the practice is situated.

Lack of youth facilities

A lack of youth facilities in the locality was also mentioned on numerous occasions. The following interview conversation with Christine emphasises exactly this point:

> ***JMC:*** *What do you think in terms of the things to do for younger people?*
>
> ***Christine:*** *There's not a lot. Not round here. […] So there isn't anything*

for that age group - just leaving school.

JMC: *Do kids use the park? Is it well-used?*

Christine: *I don't think it's well-used 'cos it's a bit remote. I mean I wouldn't let mine if they were little just wonder up there. On the other side of it there's a pond that's not even fenced off and there has been a lot of concern about this pond. What would happen if somebody went in?*

Thus there is an issue around provision and maintenance of the park, which has discouraged residents from using it. Historically the park was maintained by the Miner's Welfare and was described as a place that was safe and frequently used by families. However, this is no longer the case and maintenance is a problem. A study by Jones *et al.* (2009) showed statistically that among deprived areas (although some of them were not short of green spaces, such as parks) there was a clear social gradient with the most deprived areas not using them. They found that this was due to poorer safety conditions, which is a fundamental point. As the FA and MCA analysis I have carried out has shown, green space is statistically associated with health outcomes (greater availability is associated with better health – less morbidity and mortality); however, if these green spaces are not being used then the benefits of having access to them is redundant. So there is a public health issue at stake here.

There was also mention of anti-social behaviour as a direct result of not having any local facilities for young people. Apart from the local youth centre at Hadston House there are no recreational facilities for younger groups as Rachel points out.

> *It needs more amenities for the teenage kids really. There's nothing for kids to do around here. You know they just lurk around the bandstand at the field with their tins [alcohol] on a night time cos there's nowhere for them to go, there's nothing for them to do. And I* think *that's something that the area is lacking.*
>
> (Rachel, late 30s, local resident, interview)

With no local recreational facilities (such as a swimming pool), a cinema, or such like, there is certainly a shortfall of things to keep young people occupied. Hadston House Youth and Community Centre offers wide ranging facilities for younger people, particularly over the summer holidays; however, there is a lot of strain on this resource as it is the only local facility within reach.

Sure Start

The local Sure Start[12] centre opened in 2002/2003. The centre was originally named the Early Learning Centre but it changed its name. Sure Start was mentioned on many occasions with regards to the quality of facilities provided and resources. The comments that follow demonstrate such views:

> *Has anybody said we've got the most beautiful...Sure Start. Beautiful [Figure 6.1]. It really is.* (Dorothy, early 60s, local resident, focus group)

> *Sure Start is a great thing […] For us to get that in the village was a real bonus*. (Helen, late 70s, local resident, focus group)

[12] Sure Start is part of an initiative funded by the UK government in England. It was first launched in 1998 (under the New Labour government) and there were various waves in which Sure Start centres started to open. These centres were opened in areas with high levels of deprivation. The initiative has parallels with other international programmes, such as Head Start (United States) or the Early Years Plan (Ontario, Canada). In 2011, funding cuts by central government resulted in many centres being closed down. Fortunately, this centre still remains in the case study area (for now at least).

Figure 6.1: Sure Start Centre

However, funding cuts by the government meant that the Sure Start centre could no longer offer local residents childcare services. A report produced in March (2009) commenting on the day care provision facility recommended that this provision would come to an end in July 2009. Although this report was opposed by the local residents and residents in neighbouring areas that used the centre (almost half of those using the day care facility came from Amble, Warkworth, Morpeth and so on) and an action group was formed to prevent this, the closure of day care provision still went ahead. As a result, this has increased residents' reliance on social support for childcare from family or friends in the area. High levels of social support, which has already been discussed in ***Chapter 5***, have helped to mediate this situation. Nevertheless, this still makes it difficult for working parents and if this support was not

available it would make it almost impossible to continue with work for some of the parents, such as Laura, who has mentioned in Chapter 5 with regards to relying greatly on family for childcare.

Lack of employment opportunities: “Being unemployed is like a way of life”

As already mentioned, unemployment is widespread in the local area, and has been persistently high since the 1970s. Since the closure of Broomhill Colliery in 1962 (and the surrounding surface drifts including Chevington Drift) there has also been a decline in other industries (affecting both industries leaving the area and moving into the area).

> *I would say employment back then was around about 90% plus. Every young lad was working. Whether it be on the buildings or in the pit. I would say back then the ratio would have been maybe 7:5 in employment. 75% employed in the pits and the other 25% employed elsewhere.* (Peter, late 40s, local resident, focus group)

> *Especially when you see a lot of young people round here that's never worked since they left school.* (Linda, early 60s, local resident, focus group)

Employment is certainly lacking in the area, especially with large industries continually moving away. This sense of a bleak future with regards to employment is voiced in one of the focus groups by a long-term local resident, Pauline.

> *If the 'Tute [East Chevington Institute[13]] shuts, the school...what with the Just Roll [Cheviot foods] what else have we got here?*
>
> (Pauline, late 60s, local resident, focus group)

The closure of the middle school based in Hadston was in progress whilst I conducted this research and it was at the forefront of residents' minds. Michael remarks on how the school was a *"real asset"* and that it is *"gonna have a detrimental effect on the community"*. All of the residents that I talked to opposed the closure of the school in the public consultations that took place in the locality yet the decision to close the school went ahead in spite of resounding opposition. As a direct result of the closure of the school, many jobs were affected including teachers, kitchen staff, caretakers, administration staff, and most of whom were local people out of jobs.

Generational unemployment has also become a profound issue in the area. Dorothy states that "*being unemployed is like a way of life"* and that she now knows families that have three generations of unemployment. A long term resident, Charlie (in his early 70s), echoes Dorothy's concerns about this generational unemployment issue:

> *And another thing which I think happened as well...when you had the pits, the mines and the farms you know, going back after the Second World War, when somebody left school there was always a job for them. Even in the pits it didn't matter how you know you could be actually simple. I know people round here who were a little bit mentally deficient - they always found them a job in the pit [in the Broomhill Colliery]. So*

[13] East Chevington Social Club & Institute is a working men's club based in Hadston. It is known locally as the 'Tute'.

> *there was always employment. Now they've got to have qualifications. There's kids now and they're not bright enough to have a job. They're literally unemployable. And they've learnt to use the system; the welfare system. And they're quite happy to just prod along. They get benefits and everything. They're living off benefits. In this area and in this estate I know people into three generations their families have never worked!*

The reference made by Charlie about knowing how to use the welfare system is in line with popular ‘welfare dependency’[14] and Charles Murray’s ‘underclass’ discourses (Murray, 1990). Traditionally, these debates have focussed on inner-city and urban contexts and much has been written about ghettoisation in America, such as in Harlem (Wilson, 1985). The term ‘welfare ghetto’ has now been coined by Hancock and Mooney (2012), which refer to territories (largely comprised of social housing estates) that are stigmatised with welfare dependency labels and are blamed for moral and social decay of their communities. In short, these types of pejorative discourses blame the poor for their poverty. Despite the location of this case study in a contrasting rural, predominantly white, setting, these issues are still problematic and such discourses akin to welfare dependency and the underclass are illustrated in the above quotation and show that there is a condemnation of this alleged culture.

To contextualise Chevington in relation to unemployment and education, Table 6.2 displays key statistics on these factors and how the ward compares locally, regionally and nationally. The figures for Chevington are based on the 2001 Census results as this is the most up to date at this time (with the 2011 Census

[14] The term ‘welfare dependency’ can be traced by to 1973 with US Democrat Senator Daniel P Moynihan’s book where he claims that the issue of welfare is also the issue of dependency (Fraser and Gordon, 1994).

results have not been published yet). These figures illustrate that Chevington clearly has higher unemployment compared to England as a whole as well as scoring higher in unemployment relative to more local and regional contexts. Comparatively educational attainment is also much lower in the area. A shocking almost half of the population aged 16-74 had no formal qualifications whatsoever. This shows that Chevington unemployment and educational attainment are both serious issues. However, there are work skills training provision offered at Hadston House Youth and Community Centre that tries to tackle this issue. The project leader is extremely passionate about helping the local community and he has invested much time and effort into the range of youth services offered at the centre. These include employability training, help with CV writing, going over interview skills and techniques, and the opportunity to take qualifications in various work sectors (health and social care, business administration and customer service). All of these courses are free to those who are aged 18 years or over who are unemployed.

Nonetheless, there is still widespread unemployment in the area and more recent figures show that it is rising, as indicated by the Job Seekers Allowance (JSA) claimants figures from 2004 to 2012 (Table 6.3 and Figure 6.2). These are Office of National Statistic figures, which were provided by NOMIS.

Table 6.2: Percentage of unemployed and qualifications (Census, 2001)

Key Indicators	Chevington (Ward)	Northumberland (Unitary Authority)	North East (Region)	England (Country)
People aged 16-74: Economically active: Unemployed (%)	4.81	3.8	4.53	3.35
People aged 16-74 with 5 or more GCSEs grade A-C, or equivalent (%)	15.5	20.47	18.78	19.36
People aged 16-74 with no formal qualifications (%)	48.09	31.27	34.72	28.85

Table 6.3: Job Seekers Allowance Claimants (Nomis, May 2012)

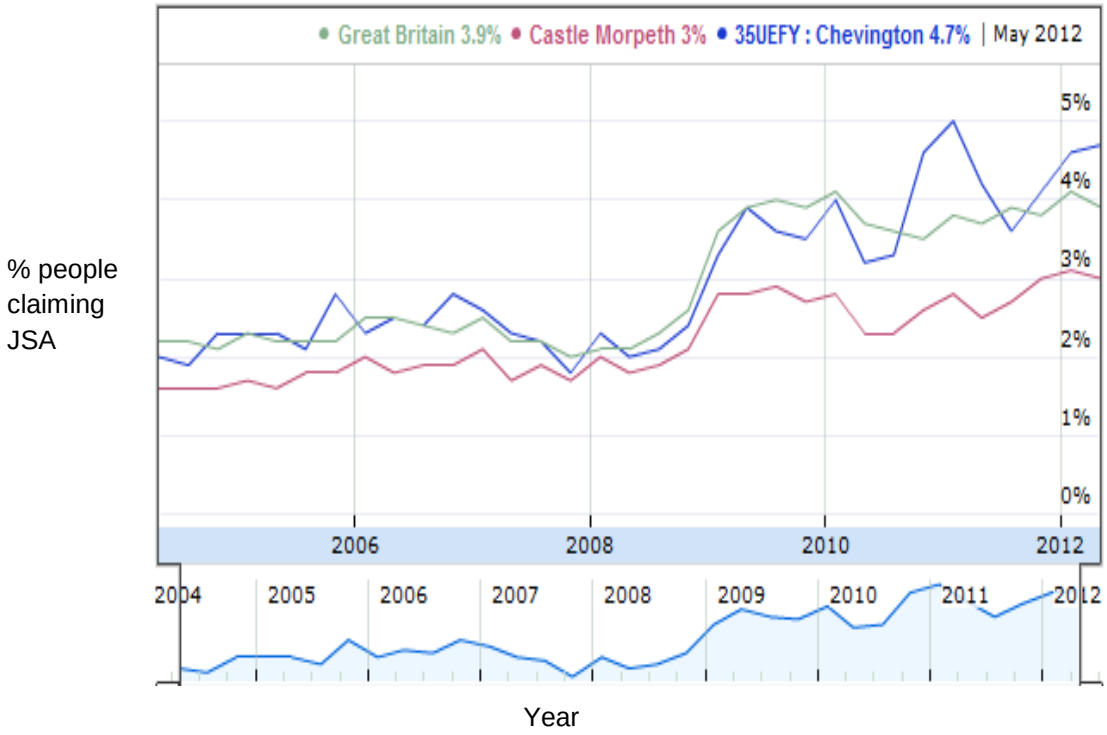
	35UEFY : Chevington (numbers)	35UEFY : Chevington (%)	Castle Morpeth (%)	Great Britain (%)
All people	132	4.7	3.0	3.9
Males	94	4.9	3.9	5.3
Females	38	4.1	2.1	2.5

Source: claimant count with rates and proportions

Note: The percentage figures show the number of JSA claimants as a proportion of resident population aged 16-64.

Figure 6.2: All people claiming JSA - quarterly from 2004

Chevington



Derek (in his mid 40s) suggests that there is a *"mentality"* underlying unemployment in the locality.

> ***Derek**: Yeah, I guess. And it's like a bit of a mentality, isn't it? Once you know people start believing that there isn't any point [...] it's a bit depressing isn't it?*
>
> ***JMC**: Do you think there is quite a lot of that mentality in the area?*
>
> ***Derek**: Well, I couldn't say now but definitely when I left school in the '80's there was. It was like...you know 'cos it was like the time of the strike and this is best that's [...] this is all you're gonna get. There really was. I mean there wasn't any [...] it's a bit bleak.*

Although there has been much regeneration in the area (largely in terms of housing) the attraction of industry into the area has not happened at the same pace. In fact, as already mentioned, industries seem to be continually moving out of the area. Peter talks about some of the types of industries that have moved out of the area soon after the closure of the mines:

> *You lost the Buffs, you had a scrap yard there as well, you had the Co-op, you had the comrades club, what else? You had The Grey Arms, which was a big building. Pettica's garage. Within the space of 150 yards you lost every one of them businesses.*
>
> (Peter, late 40s, local resident, focus group)

This trend has continued rapidly and more recently there has been the closure of local services such as the police station, middle school and Cheviot foods, as already mentioned. Therefore, it seems as though this situation is not likely to change. This link between residential location and limited job opportunities has been examined by Atkinson and Kintrea (2004) in terms of social and economic life chances. Their work is concerned with area effects (so the impact of residential location) on such life opportunities. In their qualitative research the 'ethos of dependency' (on the welfare system) also emerged as an issue (p.445), mirroring some of the views expressed in this research. The disconnection from the local job market further perpetuated this for the residents that participated in their study. They found that some participants had suffered from labour market discrimination and stigma and that intergenerational worklessness resulted in a transmission of values that were 'fatalistic and introverted' (p.452).

Out of the local residents that I interviewed who were in employment, they tended to work outside of the area as there are few opportunities within the locale. Rachel says how commuting has just become the norm and that she is used to this. Her and her partner both work in other parts of the region. So there appears to be an acceptance that if people want to find employment they have to look elsewhere as they are disconnected from the labour market where they currently live. This shows the contextual constraints of living in a deprived locality and how such contexts make it harder to engage with employment when there are so many barriers preventing this.

Migration and Housing

When I first visited the area I was struck by the unique housing situation in Hadston with contrasting social housing against new build Scandinavian-style log cabins (Figure 6.3). These log cabin houses were part of a larger “green” housing sustainable project; Hadston was a test bed for sustainable housing (Black, 2005). Much investment has gone into the area over the past decade. Housing regeneration has been significant in the growth of area with two large housing regeneration schemes: Sustainable Homes and Grainger Trust Plc.

The phase one regeneration in the area was carried out under the Sustainable Homes project, which invested over 2 million pounds in regenerating the former mining settlement (Northumberland Gazette, 27 February 2004) by creating the innovative Scandinavian housing as well as refurbishing ex-council properties and detached Dunelm Castle Homes properties. It was a collaborative project between the Northumberland Strategic Partnership (including regeneration funding from One North East) and Castle Morpeth Borough Council.

Figure 6.3: Scandinavian style housing development in Hadston

In phase two of regeneration Grainger Trust Plc was granted permission to build a further 105 properties (exceeding 200 properties in total) (Morpeth Herald, 10 July 2004). Grainger Homes was premised around affordable housing with sharing equity schemes to attract a wide range of buyers by helping them onto the property ladder. As a result of this regeneration other facilities in the area were improved including Hadston’s shopping precinct with CCTV surveillance and a new road link and roundabout. This has therefore not only had a huge impact on the quality of local housing in the area but has also attracted people into the area, causing an influx of newcomers. Consequently, inwards migration is something that is now common in a once insular area with an influx of commuters and newer residents with the investments that have taken place with regards to housing regeneration. This situation of an influx of *“newcomers”* over recent years is discussed by David:

> *The past few years the people have changed dramatically you know. Not the characters or anything but new people coming in. I mean we're just a few doors from the school and you see everybody going past in the morning and there's new faces all the time. I mean when we first came up here you knew everybody in the village*. (David, mid 60s, local resident & member of Parish Council Committee, interview)

There are now many newcomers that occupy the new housing estates and this has been accompanied by suspicion from some of the longer term residents:

> *They started to get suspicious of newcomers [...] because people were moving to new houses and they were starting to close their doors at night. They were starting to...if somebody knocked on their door they were like looking through the curtain first.*
> (Peter, late 40s, local resident, focus group)

This suspicion of newcomers has probably not been helped by the actions of local councils that brought "problem families" into the area, as mentioned by Pauline below.

> *Even this estate there's a lot of people from outside like Gateshead, Newcastle [...] But you had problem families. Problem families. They fetched the problem families over and we started to get a lot of trouble, didn't we?* (Pauline, late 60s, local resident, interview)

Derek described the *"policies"* of the local council using the analogy of a *"dumping ground"*:

> *Yeah, council housing. It seemed to be like policy. Well, I cannae say*

that but it was like a kind of a bit of a dumping ground, you know.

(Derek, mid 40s, local resident, interview)

But perhaps this conveys the strength of community since despite changes and problems that entered the area many still remained tight knit and just pulled through bringing problem families in. Popay *et al*.'s (2003) study also found that local council's policies of bringing problem families in were experienced in other deprived areas and residents described them as the *"wrong type of people moving in"* (p.65). This resonated with responses that I got as residents became more *"cynical"*:

…they did bring a lot of problem families into the area in the '90's and it became a bit sorta wild. We used to call it the Wild West down here. They were all just going crazy. 'Cos it came as a shock for me that anyone from this area would steal, even anybody I don't know, do you know what I mean? I was like in my 20's and thought that's just astonishing that anybody would steal around here and now it is kinda [...] I dunno it's just a thing that comes from age and experience. You become more cynical… (Derek, mid 40s, local resident, interview)

Commuting has become increasingly common in Hadston as it is well-positioned with nearby motorway links. Many of the newer residents that were interviewed were attracted to the area due to reasonably priced housing and getting greater value for money. To a certain extent, integration has been an issue. In a couple of the focus groups many older residents referred to these newcomers as *"strangers"* that do not integrate groups; rather they *"keep themselves to themselves"*. This is not the case for everyone that lives in the

newer housing estates but it certainly is something that may be problematic in terms of social integration.

The above issues show how the influx of newcomers into a once tight-knit community has been difficult for long-term residents to adjust to. Derek says that he doesn't know if it would be as challenging somewhere else and explains why in the following account:

> *…I suppose because you have got that many family links and family ties with the three villages [Broomhill (North & South), Hadston and Red Row] or whatever [...] so many people are interlinked and if somebody totally new comes and if they haven't got anybody kinda like association it must be hard for them.* (Derek, mid 40s, local resident, interview)

This interconnectedness may be argued to be problematic and can result in the formation of a social construction of the 'other'. Popay *et al*.'s study found that the 'other' was socially constructed by contrast to the well-established community, the 'improper people' (2003, p.65). To an extent this resonates with some of the experiences of the 'newer' residents. Louise shares her experiences of feeling like an *"outsider":*

> *And this was very tick [cliquey]. I mean I've lived here for about 29 years and I'm still considered like an outsider.*
>
> (Louise, late 40s, local resident, focus group)

Likewise, Christine paints a similar picture:

> *Yeah because I think with having children [...] It used to be a really tight-knit community and at first you did feel like an outsider but I think with having children and going to schools and to like the mother-toddlers and*

> *things like that you sharp got in. But I think if I didn't have kids it would have been a lot harder.* (Christine, local community centre care taker)

So this feeling of being an outsider is significant as it demonstrates the negative aspects of a tight-knit community and the gendered accounts of differential access to social capital as previously discussed in ***Chapter 5***. Linking this back to the two social capital concepts, although bonding social capital has been shown to be particularly strong in the area it has come with the trade off of weaker bridging social capital. Evidently, integration into the community has been an issue to some newcomers and as a result bridging capital has been difficult to achieve. An example of this is given by Christine, the caretaker at one of the local community centres:

> *Well, really I couldn't tell you many of the people that live in the new houses. They don't seem to get involved in anything that's on in here. They seem to keep themselves to themselves. I don't know if they're just like young commuters or working people that have bought here because it's basically a good access route to Alnwick, Morpeth, Newcastle, you know what I mean? So I don't know. They don't seem to get involved in village...you know like if we have a community event on it's the same faces that attend all the events that are on. We don't seem to be able to drag any of the newcomers into it.*

I felt there were communities within communities present in the area with the older long-term residents (most of whom had come from the former Chevington Drift community) and the newer residents that live in the private newly built houses that had formed their own community, usually through going to the Sure

Start centre. They seemed to know each other well and described the *"community"* as friendly and welcoming but the community that they were referring to were mainly the newer residents as opposed to longer term ones, which implies that there is not much social mix. The impact of this may therefore be important in terms of the strength of social bonds and degree of social capital, which may have negative impacts for population health. It may also be important when thinking about the effects (intended or not) of regeneration initiatives, such as housing, and what these may do to existing community structures and networks.

Social capital can therefore function in both a socially exclusive and inclusive way (Szreter and Woolcock, 2004). Generally speaking, social capital has been theorised as being positively related to health. However, Kunitz (2001) argues that social capital can be both a solution and problem to local health problems. More recently, this argument has gained currency with increasing interest in the different forms of social capital and the differential effects on health, both positive and negative (Ferlander, 2007).

The negative effects of bonding social capital includes mistrust of others (Portes, 1998), which has been demonstrated in some of the accounts in this chapter. Moreover, Ferlander (2007) states that social capital can be unevenly distributed, which resonates with some of the findings here in terms of strong bonding social capital but weaker bridging capital, thus resulting in an uneven distribution between longstanding and newer residents in Chevington. This further reinforces the need for a third dimension of social capital that recognises its divisive nature (Cairns, *In preparation*).

Discourse of relative inequality

A comparison of relative inequality <u>between</u> neighbouring areas

A prevailing discourse noticeable from conversations was around relative inequality: some of the research participants referred to themselves as *“the forgotten about people”* and the *“poor relation of Morpeth”.* They saw themselves as *“off the map”* in comparison to some of the neighbouring areas. One individual even used the term *“second class citizens”.* This highlights some of the extremely poor circumstances that the residents of Chevington face, which is characteristic of many areas with high deprivation.

Richard Wilkinson’s relative inequality hypothesis appears to be a strong undercurrent in these research findings and key to making sense of some of the problems described above in relation to how some of the local residents perceived their local area to be neglected compared to other neighbouring areas within the Castle Morpeth local authority. Central to his thesis is the idea that an individual’s health is better in more equal societies. Wilkinson contends that psychosocial pathways may be more influential than both material and social factors for the production of health inequalities (1996), which were discussed in ***Chapter 2***. Wilkinson examines this relative inequality by comparing mortality rates between countries internationally. He found that mortality was higher in less egalitarian societies. There is less evidence that suggests self-reported health is also worse; however, due to the high correlation that is observed between self-reported morbidity and it being predictive of mortality, we can probably make the assumption that differences in mortality in less egalitarian societies may also equate to differences in morbidity. Moreover,

Wilkinson and Pickett (2006) examined the evidence in a large review of 155 papers that combined various measures of population health and found that a significant number of the studies suggested that health is less good in societies where income differences are bigger. One of the explanations offered for this was the size of the area and there was a strong tendency towards more positive findings in the larger areas with 73% of the large subnational areas wholly supportive of this hypothesis compared to 45% in the smallest spatial units. The existence of income inequality in larger spatial units (country level) was also found recently by Kondo *et al*.'s study (2012) whereby they argue that country level inequality has a stronger association with health outcomes compared to inequality in smaller areas. Wilkinson has put forward the argument that income inequality in small areas is affected by the extent of residential segregation between the rich and poor and the health of people in deprived areas is not because of the inequality *within* their neighbourhoods but because they are deprived in relation to the wider society, which is something that I unpack more in the following section. Below I discuss the presence of relative inequality in the research and the implications this may have.

Relative inequality <u>within</u> the locality

In addition to the relative inequality *between* neighbourhoods that has been mentioned with regards to the poor local services comparative to other areas surrounding it and perceptions of feeling left behind and forgotten about, some interviewees also commented on some of the inequalities that existed *within* the neighbourhood. It should be noted that discussions of this sort were not from the majority of residents so some caution is taken in terms of the extent to which inequality within the locality was perceived. It is interesting, however, that

when discussing these issues related to inequality the residents did not explicitly think of the issues as forms of inequality per se. However, inequality was certainly implicit in their narratives and something that I believe may be important for population health.

The GUD AAD DAYS

The gud add days? We nivver had nowt them days.
We cadged, we borrowed, asked for a lend, naebody stole.
We had nowt to steal
They wor the gud aad days.

The gud aad days. We nivver had nowt them days.
Put your heed oot the door –y’ll hear a shoot.
Hi Maggie – got a pail o coal?
Aav got nen left – me man’s on the dole.
Whey aye says Maggie – just help yorsel
That’s what it wus like.
They wor the gud aad days.

The gud aad days. We nivver had nowt them days.
Remember Clara? She came doon the raas wi hor horse & caert
Sellin second hand clais.
If ye had nae money – just tick on.
They wor the gud aad days.
The gud aad days. We nivver had nowt them days.
Reed Raa – Aal the shops wor there.
The store – butcher, baker, chemist, draper,

Fish shop, joiner, dentist, Post Office, bike shop, barber,
General dealer, greengrocer, Bank, blacksmith,
Picture haal, dance haal, two clubs and a pub.
What can yea say?
They wor the gud aad days.

The gud aad days. We nivver had nowt them days.
Since the pits wor closed and the raas pulled doon,
The shops hev aal gone and the folk aal around here
Are moved tu Hadston, the new mini toon.
Where have they gone? The gud aad days.

This poem by Jim Shepherd depicts the shared sentiment that emerged from the research over the transition from everybody having nothing *(“nowt”)* to the unequal community in which they now have, hence returning to the analogy in ***Chapter 5*** of ‘a paradise lost’. During one of the focus group meetings, the participants referred back to the old Drift days (what it was previously like in the neighbourhood when the Chevington Drift was still there):

There was nobody anymore well-off. Everybody was the same.

(Betty, early 70s, local resident, focus group)

“Everybody had nowt” was the phrase used to describe experience in the past. I asked whether or not this change has impacted on them:

JMC: *So do you think there is some inequality in the area then? Is that what you're trying to imply? Some people are better off than others now*

compared to what it used to be?

Pauline: *Aye there is.*

Jimmy: *Aye.*

JMC: *What impact does that have on you? How does that make you feel about the area? Does that have any impact on you at all?*

Steve: *No it doesn't.*

Jimmy: *I mean you've still got the ones that do keep together. But you've got the ones that never bother. The closeness has gone.*

Pauline: *Some are stuck-up like!*

This shows that for one of the residents, Steve, it has had no impact whatsoever but for both Jimmy and Pauline the cohesiveness has been jeopardised by the unequal relations within the community. By comparison, it is clear through the discussions that there was no inequality at the Drift so it has become difficult to keep the community the way it once was. Wilkinson explains that the reason why equality in income is associated with better health outcomes is that it improves social cohesion, which has implications for social capital. However, as discussed earlier, Wilkinson’s argument relating to smaller areas holds to a certain extent given that discourse of relative inequality within the area was voiced from a small minority; rather, it was the inequality between Chevington and other areas in Castle Morpeth that was most apparent and explicitly discussed by many of the residents. One potential criticism of this interpretation of inequality in smaller areas is the view that people compare themselves with near equals (Wilkinson and Pickett, 2006) and therefore it is these social comparisons that are important rather than the wider structural inequality in societies. They go on to argue that this is conditional on a prior

recognition of their class identity and where they fit into the wider class structure. Again, returning to the interview with Michael, the project lead at one of the community centres and local Parish Councillor, he explicitly mentions that *"yes, we've got lots of deprivation"* thus conveying prior recognition of the high level of deprivation in the area, however that's not to say that class identities are homogeneous and that there is no-one else better off within the area despite area-wide deprivation which may help to explain some of the discussions in this section related to inequality within the area. Nevertheless, on the whole relative inequality between Chevington and other areas of Castle Morpeth Local Authority surfaced as the more dominant finding out of the two. To end this section I would like to finish with a quote from Wilkinson and Pickett (2006, p1776):

> And even if we live in a neighbourhood in which everyone is poor, that does not mean that we are unaware of those in richer neighbourhoods whose existence defines our lower status and relative poverty.

Discussion

This chapter has identified several aspects of the locality that may be detrimental for population health and possibly counteract some of the positive effects of the resources that emerged as somewhat protective in ***Chapter 5*** (place attachment and identity, social capital, the natural environment and rurality). Social capital and rurality, although they were found to be protective in one sense, have also been presented here as negative for population health, which reinforces the argument that risk and resilience are on a continuum. The issues raised in this chapter have profound implications and some of these are

discussed below. Policy implications of these findings are also significant and I consider these in the chapter that follows (***Chapter 7***).

As we have seen, poor public services and local amenities are certainly an issue and something that needs to be addressed. Comparatively, Chevington does less favourably than other areas of Castle Morpeth in terms of amenities, transport and healthcare. Other public amenities, such as the local park, also need to be better maintained. This perception of neglect expressed by some of the local residents in Chevington is cause for concern. That is not to say that the area has had no investment or regeneration as is the case for housing and for the local shopping precinct. These regeneration initiatives have had variable effects on the existing local community as old council houses have been refurbished as a result and the area has had a 'face lift' (News Post Leader, 20 August 2002) with the attractively designed Scandinavian log cabin style and new detached properties. However, the effects that this has had on the sense of community felt by local residents need to be considered. The issue of integration has been raised in this chapter as a result of local residents perceiving newcomers as *"strangers"* and in some cases *"stuck up"*, generating a discourse of othering. Social mix seems to have been minimal.

The lack of bridging social capital in the area due to limited integration of newcomers and the suspicion of these newcomers by some of the more long-term residents may be problematic. There may be a broader issue around the problem of tight-knit communities, which may make it harder to fit in, suggesting that bonding social capital can have detrimental effects too. However, there also seems to be another issue at stake in terms of the demographics of newcomers and by and large they tend to be younger more mobile families, particularly

commuters that live on the periphery of the neighbourhood that seem to stick to themselves and not get involved in wider community events.

The issue of rurality is also something that was mentioned in the research. Although rurality was found to be associated with better morbidity and mortality outcomes in the FA and MCA in ***Chapter 5*** (although not predictive of 'health resilience'), some of the issues voiced in this chapter show that it can be a double-edged sword. It may be somewhat health-promoting when examining the benefits and mediating effects of social networks and social capital more generally. On the other hand, it may counteract these positive effects by not having access to a reasonably priced local supermarket and poorer public transport network, which has been found to be debilitating. The implications of all of these issues are considered further in ***Chapter 7*** where public health policy recommendations are made for building and sustaining 'health resilience' in economically deprived areas.

Chapter 7

A glass half-full:
An assets-based approach to inform public health policy and practice

> The asset approach values the capacity, skills, knowledge, connections and potential in a community. In an asset approach, the glass is half-full rather than half-empty.
>
> (Improvement and Development Agency, 2010, p.6)

My intention for this chapter is to reflect upon the implications of the research findings by considering public health policy recommendations and linking these findings to current and ongoing public health policy debates and discourses. Notions of the 'Big Society'[15] currently permeate through many political spheres and public health is no exception. The implications and policy recommendations from the research findings for fostering 'health resilience' in other economically deprived areas will be discussed here in relation to the conception of a Big Society and the role of local government in promoting health and tackling health inequalities.

This chapter endorses a different way of thinking about ways in which policy makers and practitioners may promote population health and well-being more broadly. Importantly, this chapter argues that an assets-based approach is vital in promoting health and well-being locally, whereby local authorities concentrate

[15] The 'Big Society' agenda grew out of the 2010 Coalition government and is built upon the premise of empowering local people and communities. This transfer of power has received both positive and negative reactions.

on the assets that are already within local communities and seek to build upon these as opposed to focusing on the deficits, which focuses on the risks and problems facing disadvantaged communities. Public health in England has traditionally been 'pathogenic'[16] and deficit-focused in its approach to tackling health inequalities. However, there has been a positive shift in the new wave of public health that has put wellbeing at the centre of the public health agenda, which will be discussed throughout this chapter in relation to an assets-based approach.

This chapter is divided into three sections: (1) The first section discusses the current public health agenda by situating it within the contemporary health and social care changes taking place in England and how the term 'resilience' is being used in public health discourse; (2) Secondly, it considers some case studies of 'what works' for health promotion and how these, combined with the research findings in this thesis, may inform area-based health initiatives to promote 'health resilience'; (3) Lastly, this chapter makes policy recommendations to promote and sustain population 'health resilience' in economically deprived areas, taking into account the main findings of place attachment, social capital and the natural environment, and emphasising a need to focus on health assets that may already exist in local communities.

While some of the findings may be straightforward, other findings, including the importance of place attachment and social capital, may be harder to implement into area-based initiatives to promote health and more specifically 'health resilience', since these processes mature over time. Therefore, whilst this

[16] The opposite of 'salutogenic'. Focuses on the origins of disease and/or ill-health as opposed to what makes us healthy.

chapter proposes recommendations for the promotion of 'health resilience' in other economically deprived areas, there is no denying the difficulties involved in such a task, especially when working with areas that have diverse contextual settings. As previously discussed, social capital and place attachment within the case study were contingent on the past and therefore the path dependency (think back to complexity theory), which was related to the shared industrial history that brought this particular community together. In this sense, place biographies are therefore extremely important as all places have been shaped by their historical, social, economic and political pasts. As such a 'one-size fits all'[17] approach may not be helpful or necessarily 'work'[18] in other settings.

This chapter recognises the complexity involved in identifying protective factors or resources underlying 'health resilience' and how these may indeed vary from one place to another, making it impossible to come up with a set recipe as such. However, this chapter shows that there can be some common ground in terms of 'what works' using some of the same fundamental ideas. There are many health promotion initiatives operating throughout England, which have the same foundations and seem to be suggesting the same things 'work' for health promotion despite diverse settings. This includes working with local communities to develop connectivity, empowerment and sustainability.

[17] The no 'one-size-fits-all' catchphrase is now increasingly used in public health throughout England with regard to wider acknowledgement that blanket approaches have been unsuccessful in tackling health inequalities and more localised ways of working is paramount to addressing the widening health gap.

[18] 'What works' is written in inverted commas, since I am not suggesting that there is necessarily one way of 'working', or indeed, if something appears to 'work' in health promotion for a particular community, it may not 'work' in a different context. This phrase has been high on the political agenda, not just in the public health sphere. It has been entangled in the need for a greater evidence-base. This chapter takes the stance that 'what works' should come from communities themselves. As such, in this chapter I offer only studies that appear to have been highly valued by the communities themselves.

Section one

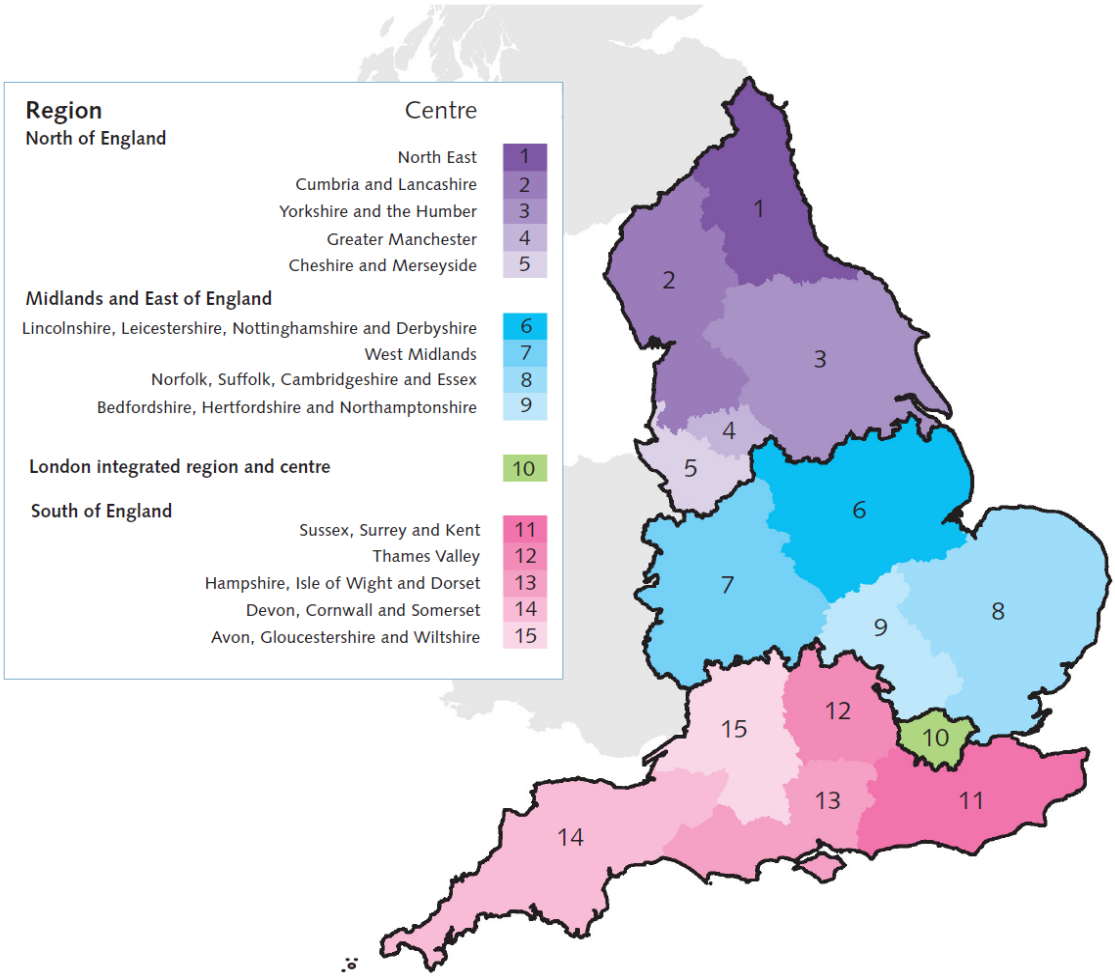
Public health agenda: improving health and wellbeing

As already noted in ***Chapter 1***, a resilience approach is attractive for public health policy and practice, since the current public health agenda appears to have a 'salutogenic' outlook as one of its main focuses is on promoting health and wellbeing with one of the core strands being 'health improvement and population health' (Department of Health, 2012). There will be a new public health director appointed in April 2013 to be in charge of this strand.

Public health in England is in a constant state of flux as a result of the ideas proposed by the 2010 Conservative-Liberal Democrat Coalition government to form a new Public Health England. As it is currently understood, there will be four regions that will take effect from next April (2013): North of England; Midlands and East of England; London; and South of England. Across these four regions there will be fifteen local Public Health England centres set up to promote health improvement for local populations. Figure 7.1 displays the new regional and local centres.

Whilst this localised approach to improving population health is important and I argue a necessary and important development, I am sceptical about how 'local' the 'local' centres will in fact be given that there will only be fifteen operating throughout the country.

Figure 7.1: Regional and local centres under the new Public Health England



Source: DH, 2012, p.16

The role of the local government in public health

> Effective local delivery [of public health] requires effective participatory decision-making at the local level. This can only happen by empowering individuals and local communities.
>
> (The Marmot Review, 2010, p.9)

The role of local government is becoming increasingly important for public health with recent changes from central government. The following extract from a report by the Local Government Improvement and Development Unit

discusses the role of local government for promoting health and wellbeing and refers to the term resilience:

> …local government is about: supporting a better life for people and helping to **build resilient communities**, **now** and **over the longer term**. (Local Government Improvement and Development, 2010, p.6 [Author's emphasis added])

This idea of building strong and resilient communities now and in the future suggests that sustainability is at stake. This research has identified potential issues for the future of 'health resilience' and as such the sustainability may be jeopardised in the future for the population in the case study. This is why it is important for local governments to work with local communities to identify local-specific areas for improvement. The idea of 'joined-up' approaches between health services and local communities, also being referred to as 'local partnerships', is therefore key to the new public health agenda.

Three White papers, *Choosing Health* (2004), *Liberating the NHS* (2010), and *Healthy Lives, Healthy People* (2010), have been pivotal in shaping this current agenda. *Choosing Health's* chapter on 'Local communities leading for health' sets out three key priorities (Department of Health, 2004):

(1) Local authorities providing local leadership to bring concerted and integrated local action on health;

(2) Investment and new initiatives in disadvantaged and deprived communities; and

(3) Promoting partnership between the public and voluntary sectors with business to develop national and local champions for health and extend opportunities for people to take up healthy lifestyles in local communities.

Similarly, *Liberating the NHS* sets out the same values and objectives, including empowerment – akin to the Big Society vision, joined-up approaches, and the role of local government in taking greater responsibility for local health and wellbeing, particularly through the establishment of 'Health and Wellbeing Boards'. It states that local authorities will therefore be responsible for the following (Department of Health, 2010, p.35):

- Promoting integration and partnership working between the NHS, social care, public health and other local services and strategies;
- Leading joint strategic needs assessments, and promoting collaboration on local commissioning plans, including by supporting joint commissioning arrangements where each party so wishes; and
- Building partnership for service changes and priorities. There will be an escalation process to the NHS Commissioning Board and the Secretary of State, which retain accountability for NHS commissioning decisions.

Moreover, the *Healthy Lives, Healthy People* (2010) White paper also emphasises health and wellbeing throughout life and putting 'local communities at the heart of public health' (p.2). Prior to Jeremy Hunt, the former Secretary of State for Health, Andrew Lansley, writes that 'people and communities will drive directly the change we need to build a stronger, healthier Britain' (p.3), steering the way forward for public health.

As we have already seen in ***Chapter 5***, initiatives that are conducive to drawing on human and social capital, such as community capacity building and empowering local people, may make a difference to population health and have the ability to bridge people and services. We have already seen such initiatives in the case study with the local beat meetings. These types of local initiatives, whether focused on improving health or not, that are able to bring together diverse people and strengthen bridging social capital are arguably important in the overall objective of health promotion. Moreover, such initiatives are in line with the Big Society agenda and drawing on asset-building. Whilst I stress that these ideas are not new, with a great deal written about community capacity building twenty years ago (Kretzmann and McKnight, 1993), this chapter argues that the time is right (thinking particularly about the current political and economic climate) to carry these ideas forward and implement them more widely across the country.

Section two

Case studies: So 'what works' in health promotion?

In this section a few examples of existing public health initiatives and programmes undertaken in diverse contextual settings throughout England are presented. While this thesis has identified a number of salient issues (social capital, place attachment and the role of the natural environment in promoting health and 'health resilience') it is difficult to generalise these findings. Therefore, this section seeks to explore whether or not these factors are important for promoting health and wellbeing in other settings, both nationally and regionally in the North East of England. Moreover this section focuses on

the core threads that seem to run across the different case studies, including connectivity, empowerment and sustainability, all of which are at the core of the projects.

Case study 1: People for public health

Again thinking back to the 'Big Society', the concept of 'empowerment' was integral to this 'People for public health' study. However, this national study was conducted prior to the 2010 Coalition government yet discourses around community empowerment were gaining currency prior to this. The pilot studies took place in three regions across England: Yorkshire & Humber, the North West and the South East.

Box 1

Case Study: 'People for public health'

A project undertaken as a partnership between Leeds Metropolitan University, NHS Bradford & Airedale, and the Yorkshire & Humber Regional Public Health Group (2010). The research was commissioned by the National Institute for Health Service Delivery and Organisation Programme.

This study was conducted over 27 months (2007-2009) and consisted of five public health programme case studies (three of which were based in Yorkshire & Humber, one in the North West and one in the South East of England): sexual health outreach, walking for health, breastfeeding peer support, community health educators, and neighbourhood health.

In total 90 respondents participated in the interviews. These respondents comprised of lay workers/volunteers, practitioners, commissioners/strategic leads and stakeholders. 45 service users were also interviewed in the case studies.

Findings revealed there were several motivational driving factors for getting involved in the public health programmes. There were three study recommendations: enable people to make a contribution; investment in support systems for delivery; and, think carefully about the sustainability of these projects.

The role of volunteering (human capital) was also significant in this study in terms of building social capital via mutual aid and reciprocity which strengthens community networks. The role of volunteering for promoting health and wellbeing and reaching marginalised groups is recognised by the Department of Health's (2008) report. To provide some context to each of the five public health programmes, I briefly provide descriptions of each of the projects.

Firstly, the sexual health outreach service had already been running for four years and was set up to address the sexual health of gay and bi-sexual men. It is run by a voluntary organisation. The service provides screening, information and support, and a counselling service. Secondly, 'Walking for Health' is a national initiative, which seeks to promote volunteer-led health walks throughout England. It is co-ordinated by Natural England and the programme operates in both urban and rural areas offering walks ranging in ability. The premise of this programme is to improve physical activity and general health but it has been argued that there is now an obesity prevention focus. Thirdly, the breastfeeding peer support group was run in a local Sure Start centre originally set up by the community in 2002 to promote breastfeeding. It offered peer support services including offering evidence-based information and friendly support. Fourthly, the Community Health Educator public health programme was set up in 2004. It is based in a voluntary sector and involves health promotion through events and training sessions. It works with diverse marginalised social groups. And finally, the neighbourhood health project was set up through the New Deal for Communities[19] programme in 2002. It aimed to reduce health inequalities and

[19] New Deal for Communities (NDC) was announced in 1998, under the Government's National Strategy for Neighbourhood Renewal. It was implemented into disadvantaged communities throughout England. The NDC programme set out to address three main place-related

improve health in a large housing estate by offering resident a forum to discuss issues, seek advice, and join groups with wide-ranging activities on offer (such as tai chi sessions, walking groups and suchlike).

The motivational drivers for getting involved in the above programmes were fivefold: altruism, to enhance career, the 'time was right' for some of them in terms of giving something back, health and social benefits, and because of previous experience of being a service user. Challenges to sustainability were also raised by this study. Sustainability issues included maintaining peoples' commitment to the projects, supporting community infrastructure through provision for training and development, and having personal support, rewards and remuneration for lay workers and volunteers.

Many of these diverse case studies draw on existing groups or resources, such as volunteers, already within the local areas. Again, this reinforces the notion that a focus on assets already within communities may help with the success of such initiatives.

Case study 2: Gateshead Council

Gateshead Council has been involved in a series of health promotion initiatives, particularly over the past decade. Three examples of such initiatives are presented below. In the early 2000s the *Healthy Communities Collaborative*[20] *(HCC)* was set up. This collaboration endorsed the type of 'joined-up' approach that is constantly being advocated by the Department of Health. While the HCC

outcomes (crime, community and housing/physical environment) and three people-related outcomes (education, health and worklessness). The 10-year programme sought to make sustainable changes (Department for Communities and Local Government, 2010).

[20] The Healthy Communities Collaborative is part of a wider national programme run by the National Primary Care Development Team (NPDT). It involves local people working with a range of agencies and professionals from public and voluntary sectors.

was a national collaboration that sought to reduce health inequalities, there were three pilot sites and Gateshead was one of them which exemplifies Gateshead's proven track record of joined-up and multi-agency working. The chosen topic for these initial pilot studies was to reduce falls in people over the age of 65.

> …community members are very effective in running health initiatives themselves, especially in prevention. They're often more successful than traditional public health programs, because local people are so strong in looking after health issues that impact their own neighborhoods…
>
> (Linda Henry, HCC Director, Institute for Health Improvement)

Box 2

Case study: Gateshead Council

Healthy Communities Collaborative (HCC) This initiative for fall prevention in over 65 year olds began in 2002. Gateshead was a test bed and involved in the pilot. The collaboration involved working with housing and public services to improve housing infrastructure. Fitness instructors took part in the project and ran tai chi sessions for older age groups. After the first year, the project had been successful in reducing fall in 65+ by 32%. In 2005 the HCC was then extended to other regions.

Communities for Health Gateshead Council received £100,000 by the Department of Health in 2004/2005. The programme was designed to promote collaboration between local organisations including local communities, local authorities, NHS, voluntary sector and local businesses. Various projects emerged from this programme from community vegetable gardens to breastfeeding.

Lantern parade The lantern parade is part of the Healthy Hearts Lantern Group, which seeks to promote health through community engagement. Every lantern carries a heart inside and each year there is a theme to raise awareness, such as stop smoking.

The second example is the *Community for Health* programme launched in 2005 in response to the 2004 *Choosing Health* White paper, already outlined. This programme had three aims (Gateshead Council, 17 April 2007, Report):

- To engage communities in their own health and develop their capacity to support individual behavioural change for healthier lifestyles;
- To build partnerships between organisations and communities; and
- To develop innovative practices for community based health improvement

Various projects, totalling to over 50, were set up during this programme and they ranged from breastfeeding initiatives to community vegetable gardening, all drawing upon the current resources and facilities available to the communities within Gateshead.

Another example of Gateshead's longstanding community-based engagement in health promotion activities includes the Lantern parade in Wrekenton as part of the Healthy Hearts Lantern Group, which originally started in the 1990s. This annual procession aims to bring the community together to promote health and wellbeing.

Gateshead's recent *Place Shaping for Health and Wellbeing*[21] event that brought together Gateshead Council, Gateshead Primary Care Trust (PCT), FUSE[22], and academic researchers from North East universities is also illustrative of the growing localised partnership approach to health promotion. Being involved with facilitating group discussions and preparing drafts of the report, I managed to get insights into some of the new functions of, for example

[21] 29th March 2012 FUSE Quarterly Research Meeting,
[22] FUSE, the Centre for Translational Research in Public Health.

Health and Wellbeing Boards and the role of the Joint Strategic Needs Assessment (JSNA)[23], in promoting health within the Gateshead area.

Some of the key messages from the workshop include valuing local knowledge in understanding how place of residence shapes their health and well-being, building better links between the JSNA, and better linking the JSNA with what is actually going on in local communities 'on the ground'. However, the day was still very much shaped by what local communities 'need' as opposed to what they may already have in terms of 'assets', which I argue was one of its shortfalls. Nonetheless, the increasingly recognised value of working with local communities themselves, valuing their knowledge, and therefore steering and taking the lead on health promotion seems positive.

Case study: Healthworks (Easington)

Easington's health promotion initiative, Healthworks, in another example of a joined-up partnership between the NHS, community services, local organisations and volunteers throughout County Durham and Darlington. The healthy living resource centre is located in Easington colliery, an area that is among the most economically deprived in the country and performing poorly in terms of health. Within the North East region, this health improvement service that was set up in the past two years is very much considered to be a good model of 'what works' in health promotion. Its fundamental objective is to promote and support positive health within the local community. To help with this objective, it offers over 45 community support services. Some of the services it offers includes a GP-led health centre, health trainers, healthy eating

[23] Joint Strategic Needs Assessment (JNSA) was formed after the Local Government and Public Involvement in Health Act in 2007. The JNSA brings together PCTs and local authorities.

and weight management classes, podiatry, food co-op, support groups, neighbourhood policing, adult and family learning courses, community safety and advice services such as Citizen's Advice Bureau and Welfare Rights. Whilst some services are health-focused, other services offered at the centre are not.

Box 3

Case study: Healthworks, Easington

Healthworks works in partnership with NHS County Durham & Darlington, County Durham & Darlington Community Health Services, Northumbrian Water and Durham County Council. Organisations and charities that are also within Healthworks include Age Concern, Mental Health Matters, Salus, District of Easington Warm Homes, Northumbrian Water, amongst others.

The healthy living resource centre, based in Easington Colliery, provides a wide range of health and community information, services, activities and service user groups to local residents in County Durham and Darlington with the ultimate aim of supporting and promoting health and well-being.

These various and wide-ranging services recognise the wider determinants of health, such as education, in health improvement. Healthworks has won awards for the positive impacts on local communities. Its service user group is integral to its success. Empowerment of local people within the community, taking greater control and having more input in the types and quality of services offered in the area, is again at the heart of this local initiative.

To summarise this section, all of the above case studies seem to share some basic fundamental principles about 'what works' in health promotion and some of these overlap with the research findings in the thesis, such as strengthening connectivity and community cohesion through community-engagement activities (enriching social capital). Some of the initiatives also encourage interaction with the natural environment in terms of health walks or community gardening

projects, which were similar to the findings from this research. So whilst these various public health initiatives have taken place in diverse contexts and in different regions in England it could be argued that the research findings may hold some wider generalisability to other settings. Certainly, initiatives that focus on existing assets within communities and those grassroots projects working collaboratively with local people and letting them spearhead local priorities in their own areas appear to work well.

Community engagement and empowerment initiatives, working with local governments and joined-up collaborative approaches for tackling public health issues are not only high on the agenda in England. Situating these ideas within a more international context, these types of initiatives and ideas are ever increasing. For example, the Project for an Ontario Women's Health Evidenced-Based Report (POWER)[24] study in Ontario makes the following policy recommendation:

> **Strengthening linkages** between these sectors can help assure that people can readily access needed care and services to promote, maintain, and improve health. (p.11 [Own emphasis added])

Therefore, ideas about connectivity, not solely in relation to connecting people within communities, but also in terms of connecting communities to health and other social services and organisations in order to promote and sustain health seem to be increasingly recognised as a valuable and important way forward.

[24] The POWER study used a community-engaged research model. It is a collaborative project in partnership with the Keenan Research Centre in the Li Ka Shing Knowledge Institute of St. Michael's Hospital and the Institute Clinical Evaluative Sciences based in Toronto, Canada. More information about the project can be found at: https://powerstudy.ca [Last accessed 10/10/2012]

Section three

Public health policy recommendations

Based on the research findings from this thesis and the various case studies presented in this chapter, I make five key policy recommendations for public health policy and practice that have emerged in this research. These recommendations seek to foster 'health resilience' among economically deprived areas, whilst acknowledging the diverse contexts and localised challenges that these places may have. They include working with local communities; building social capital (both bonding and bridging); focusing on identifying 'health assets' by using an assets-based approach; building partnerships; and, thinking about the sustainability issues of any public health initiative.

A localised approach for local health promotion: working with local communities

1. **Work with local communities**

Lessons can be learned from my case study and the other case studies show how local communities are best placed to improve the health of their populations and working with local communities can make them more empowered. Foot (2010) argues that 'local government and their partners, local communities and neighbourhoods play a pivotal role in creating the conditions for good health and wellbeing for all, and in addressing the social determinants of health inequalities' (p.8). The role of Health and Wellbeing boards will be central to this goal by facilitating such collaboration between local government and communities. The scope of these boards means that they will cover some

of the wider determinants of health, which puts them in a good position to make a real influence on the ground.

2. **Build social capital (both bonding and bridging) from existing networks and groups in the community**

As we have seen in ***Chapter 5*** and ***Chapter 6***, social capital is something that is of great significance. Firstly, the bonding social capital that is paramount to the tight-knit former mining community. However, bridging social capital was weak in an otherwise tight-knit community. It can be argued that this has the potential to divide people and create communities within communities, which may have important implications for social cohesion and in turn health promotion. Policies that encourage and protect social cohesion and social networks should be considered. Moreover, Knapp *et al*.'s (2010) study has found real economic benefits of community capacity building initiatives, such as befriending and time banks (community currency – using time rather than money). They found that a saving of around £300 per person per year would come from befriending schemes (measured by the Partnerships for Older People Project pilot studies) and around £1,300 per member of a time bank. These quantifiable economic benefits perhaps further reinforces the desirability for strengthening social capital within communities. Other research that has also examined 'best buys' for public health include investing in social support and integrations and supporting communities (community development, environmental justice, green space, bridge safety, debt advice amongst others) – see Friedli and Parsonage (2009) or Knapp *et al*., (2011).

Campbell and Gillies (2001) posit that critics of social capital suggest that social capital is popular due to its implications for policy as it is cheaper to encourage

people to get involved in their local community than try to reduce income inequalities. It might also stimulate victim-blaming – those who do not get involved in community will have worse health (Muntaner and Lynch, 1999). Moreover, as we have already seen, certain aspects of social capital might be more health enhancing than others (NICE, 1999) so we need to be cautious about how we use this term and what forms of social capital are most beneficial for health. Therefore, whilst there may be economic gains to be made by developing social capital, it is important that we consider what types of social capital and the differential impacts these may have for health.

Focus on identifying health assets[25]

3. An assets-based approach may be useful

A health asset may include social relationships, social networks, community groups, and so forth. Strengthening these assets, whatever form they may take, can help to promote health. In the 2010 IDeA report, Foot & Hopkins argue that while our most marginalised communities have needs and problems, they also have social, cultural and material assets and focusing on what they do (assets) have as opposed to what they don't have (needs) will help them to overcome the health challenges they face. There is therefore a need to identify and mobilise these assets for health gains. Moreover, Friedli (2009) suggests that 'such assets might be social or cultural and contribute to **resilience** at an individual or community level' (p.23, own emphasis added). Therefore, building on assets for health gains may also contribute to 'health resilience'.

[25] 'A health asset is any factor or resource which enhances the ability of individuals, communities and populations to maintain and sustain health and well-being' (Morgan, 2009)

I suggest that we could replace the Joint Strategic Needs Approach with the Joint Strategic Assets Approach, which may help with the above objective. In addition, the IDeA report has proposed tools to identify health assets, such as appreciative inquiry, open space and story-telling (2010).

Build partnerships

4. **Building partnerships between public health practitioners and decision-makers, local communities and local organisations**

For areas where there are local protective resources that may mediate the detrimental effects of deprivation on population health, the potential barriers, for example those identified in this paper, must first be addressed by the appropriate local authorities who are ultimately responsible for these wider social determinants of health, including public transport, housing and so forth.

Think long-term: Sustainability

5. **Sustainability should be at the heart of any public health initiative**

The Marmot Review's (2010) policy objectives include creating and developing healthy sustainable places and communities. Any initiative that fails to think about this will fall short and have short-term effects.

The finding of place attachment should be emphasised here. Popay *et al*. (2003) argue that there is an 'urgent need for public policies to develop ways of maintaining people in places as the places themselves are improved, since these wider attachments between people and places provide the foundation for any worthwhile social interventions' (p.69). Place attachment and social capital are built over time, not overnight. Therefore, any intervention that seeks to

strengthen either of these will need to seriously consider the longer-term strategy of sustaining such initiatives.

Summary

This chapter has discussed the contemporary public health agenda in England, considered the main case study findings and how there are some similarities with 'what works' in other places using different public health initiatives but ultimately working with the fundamental ideas of connectivity via community empowerment and building social capital, joined-up partnership working, and sustainability issues. Caution is taken when mentioning 'what works', since all local communities will have their own assets and priorities. As such, this thesis does not advocate a 'one-size-fits-all' approach. The *Healthy Lives, Healthy People* White paper states that 'one-size-fits-all solutions are no good when public health challenges vary from one neighbourhood to the next' (2010, p.2). Instead, a localised approach that works with communities, on the ground, to promote health and wellbeing is advocated.

Promoting and sustaining 'health resilience' in economically depleted areas is by no means an easy task. Indeed, there is no 'set recipe' (Mitchell *et al*., 2009). However, I hope to have provided some areas for thought and action points in this chapter. A successful economy is not the only thing that determines population health. Social and natural forms of capital are also argued to be significant for public health. I would like to end this chapter on a positive note:

> Focusing on the positive is a public health intervention in its own right.
>
> (Foot, 2012)

Chapter 8

Discussion and Conclusion

This final chapter comprises four parts. In section one, I synthesise all of the research findings from the statistical analyses and in-depth qualitative case study and I discuss how these have addressed the initial research aims and questions that were presented in ***Chapter 1***. I also relate these findings to other studies in the field. However, it should be made clear from the outset that this research does not claim wider generalisability of the research findings. Whilst lessons can be learned from the research about possible protective factors operating in an economically deprived area, it is recognised that wider transferability of these findings may be limited. This may particularly be the case because the further statistical analysis that compared 'health resilient' versus 'not health resilient' areas did not find some of the factors to be statistically significant or indeed because the direction of association was not what would be expected.

In section two, I critically discuss both the strengths and limitations of the research. Although a number of limitations of the research are recognised, it is felt that this research has made a significant contribution by addressing some existing gaps in the field.

Section three considers the contributions this research has made to health geography and public health policy emphasising some of the points made in

Chapter 7 about working with local communities to identify health assets that may help to foster 'health resilience'.

The final section of this chapter identifies potential avenues for future research, including the utility of comparative case studies and examining health trajectories over time, before making concluding comments.

Section one

Research findings

This research has applied the notion of 'health resilience' at the area-level throughout England at different geographic scales, with a particular focus on the North East of England region. It used a mixed-methods approach that combined statistical analysis with an in-depth qualitative case study. The statistical analysis results from the Regression Tree Classification (RTC) revealed that scale was of paramount importance for the identification of 'health resilience'. Three geographic scales were examined in this research: LAD, CASWARD and LSOA. The economically deprived areas that were identified as 'health resilient' were not always consistent with regards to the health indicators nor were they consistent when different geographic scales were examined. This implies that 'health resilience' is both dependent on the health outcome that is under examination and the scale used.

The qualitative case study findings showed that there may be significant protective factors underlying 'health resilience' in Chevington. The findings that emerged from the case study include the importance of place attachment (related to industrial heritage), social capital, and the role of the natural environment. These protective factors were also further examined using

secondary data in order to find out whether or not they held wider transferability beyond the case study. Whilst the factor analysis and multiple correspondence analysis showed that these factors were also clustered amongst areas with better health outcomes, when directly comparing resilient/not resilient areas through a logistic regression analysis these factors were not statistically significant. However, this may be due to limitations in the data that were used (as I discussed in ***Chapter 5***) or the fact that many of the 'health resilient' areas were urban and so the role of the natural environment, for instance, may not feature as strongly in understanding what may be protective in those 'health resilient' areas.

While there were possible protective factors operating in the case study of Chevington there were also risks to the sustainability of 'health resilience', which were presented in ***Chapter 6*** and considered in relation to public health policy and practice in ***Chapter 7***. In addition, the finding of social capital was both found to be a possible protective mechanism underlying 'health resilience' as well as a possible risk factor due to its potentially divisive dimension. Framing this somewhat contradictory finding using a risk-resilience continuum may be helpful.

How do the research findings relate to the research aims and questions?

Returning to the original aims of this doctoral research, firstly, it sought to identify economically deprived areas (at different geographic scales) in England that exhibited better health outcomes than would be expected given significant economic adversity; secondly, the research aimed to ascertain possible

protective mechanisms for these unexpected health outcomes that may account for findings of *'*health resilience*'.*

The research questions that have been examined in this thesis stemmed from the existing gaps that were identified in area-level 'health resilience' literature, which included the uni-dimensional operationalisations of 'health resilience' that solely focused on longevity or survival (life expectancy or mortality); analysis limited to large-scale geographies (either parliamentary constituencies or local authorities); and, perhaps most significantly, only limited understandings of 'health resilience'.

The research questions addressed in this thesis were threefold. In the following, I consider each of these research questions in turn and explicitly demonstrate how I have addressed each one.

(1) Which areas in England can be identified as exhibiting 'health resilience' (based on morbidity and mortality) at different geographic scales?

A statistical technique, RTC, was conducted to address this first research question. RTC was selected since it was able to work with the concept of outliers to identify 'health resilience' among similarly deprived places. The geographic scale at which 'health resilience' is examined is of paramount importance, since local authorities and parliamentary constituencies are extremely large and heterogeneous geographic units and as such they may miss wide variations within these areas. The statistical findings revealed that the South of England performed better in all of the health outcomes examined and the majority of the 'health resilient' areas were also located in the South

(London more precisely). However, there were some exceptions to this rule with a couple of the more deprived regions, including the North East, that were also found to contain 'health resilient' areas but these were only identified using a finer scale at CASWARD level. Within the North East more in-depth RTC analysis was conducted at an even finer geographic scale: LSOA. The results showed that there was hardly any correspondence between the 'health resilient' areas identified at all three spatial scales. This further reinforces the significance of scale in the identification of 'health resilience'. For example, taking Chevington as an example, none of the lower super output areas that fell within Chevington were found to be 'health resilient' below ward level. This might then beg the question of whether or not these finer geographic units are too fine a scale to identify resilient populations. The very fact that only out of 1,656 between 1 and 10 areas were identified as 'health resilient' suggests that this scale is too small. Conversely, local authorities may be too large. Wards may therefore to be a good compromise in terms of population size.

Nonetheless, when these findings were compared with other findings in the field, some of the findings corresponded, which suggests that these areas are actually exhibiting 'health resilience' and it is not merely an artefact of the data or method used.

(2) Are there any protective mechanisms or resources operating in these 'health resilient' areas? If so, can these protective factors be translated into public health policy in order to help other deprived areas have better population health?

The shared history (founded on industrial heritage of coal-mining) was found to be significant in terms of both place attachment and shaping community relations. Social capital was a key empirical finding. Bonding social capital featured strongly mainly among the former Drift community. In comparison, bridging forms of social capital were much weaker within Chevington, especially as there was a clear divide between longer term residents and newcomers and some underlying tension between these two groups in terms of lack of integration. The combination of strong bonding social capital among homogeneous groups and weak bridging capital between heterogeneous groups was argued to be divisive for the community, creating divisions among the population rather than bridging them together. Therefore, social capital was argued to be protective in one way but potentially problematic in another way and a possible risk factor that may present problems for the future of 'health resilience' within Chevington. The role of the local natural environment in positively shaping population health in the case study also emerged as significant for the local residents. Theoretical and conceptual frameworks that were used to situate these research findings included ideas from therapeutic landscapes, biophilia, topophilia and attention restoration theory.

In relation to policy implications of the research findings, ***Chapter 7*** discussed how a resilience approach that focuses on the origins of health and health-enhancing place effects may be useful. Several policy recommendations were outlined including working with local communities to identify 'health assets' that already exist and working to enhance these resources, building healthy forms of social capital (both bonding and bridging), building partnerships between local

government, communities, health services and organisations, and focusing on sustainability of initiatives that aim to improve health.

The public health recommendations take into account the difficulties in generalising the case study findings to other more diverse contextual settings. Nonetheless, this thesis argues that lessons can definitely be learned from this case study in terms of the contingent nature of 'health resilience', thinking particularly about the significance of past and how this place attachment and social capital, and the importance of the psycho-social health explanation for many of the findings (place attachment – emotional bond, social capital, and relative inequality).

(3) Are there any potential barriers or risk factors that could prevent economically deprived areas from going on to achieve better health?

Chapter 6 presented further case study findings that may be perceived as risks for achieving and sustaining 'health resilience'. Several aspects of the locality emerged as potentially threatening for 'health resilience' in the research, including poor public services and amenities (particularly poor public transport, availability of local affordable supermarkets, the quality of healthcare, lack of leisure and recreational facilities), lack of employment opportunities, migration and housing regeneration-associated issues. Residents feeling *"off the map"* and the *"forgotten about people"* within Castle Morpeth was significant. Thus, this led to a discussion of resilience and risk being part of a continuum as opposed to 'opposite sides of the coin'. Materialist (employment opportunities) and neo-materialist (poor provision of public services – transport and

healthcare) as well as the psycho-social model could be used to understanding some of the findings related to relative inequality.

Based on the research findings, this thesis has argued three main points. Firstly, this thesis has argued that it *is* possible to weaken the typically strong relationship between area-level deprivation and poor population health, through the identification of some areas 'defying the odds' as they achieved relatively positive health outcomes (measured by both morbidity and mortality). Such an argument is consistent with views expressed earlier in this thesis by Macintyre (2007) and Fagg (2009) who argue that poorer areas do not necessarily always lack health-promoting resources.

Secondly, it is argued that while 'health resilience' has been identified in the analysis, there is much variability in 'health resilience' in terms of both scale and health outcome considered. Therefore, it is important that researchers interested in applying this notion of 'health resilience' at an area-level are aware of the need to think critically about these issues.

Thirdly, this thesis has argued that resilience and risk are not polar opposites; rather, they should be considered as a continuum. While some of the protective factors were identified as contributing towards the finding of 'health resilience', they could also be risk factors, for instance social capital. Moreover, this research identified risk factors that may present challenges for the sustainability of 'health resilience' in the future.

Section two

Study strengths

One of the main strengths of this research is that it has examined different geographic scales and included a small, fine-scale analysis, which has not previously been done in studies of 'health resilience' in the context of England. I have therefore been able to identify the effect of scale for the identification of 'health resilience' and whether or not it is entirely dependent on scale and perhaps even an artefact of the method used. In ***Chapter 5***, I argued that this was not the case and that findings of 'health resilience' were not an artefact, since some of the results complement other studies. Moreover, I argue that Chevington is an example of a 'health resilient' area, which was identified through the RTC method.

Secondly, I used a mixed-methods approach. The statistical analysis and in-depth qualitative case study informed one another in a complementary way. The benefits of exploring something as complex as 'health resilience' required an in-depth examination because some factors (e.g. place attachment) are difficult, if not impossible, to fully capture and operationalise through secondary data.

Some of the case study findings complement those of other studies. Mitchell *et al*.'s (2009) case study findings of community cohesion, strong social networks and the natural environment present in resilient areas perhaps strengthens the findings from this case study and indicates that the place-specific factors operating in Chevington may indeed have operated elsewhere.

Study limitations

There are a number of recognised limitations to this research. Below I outline these limitations.

Health measures

The selection of health variables has some limitations. These indicators are now over ten years old, from the 2001 Census (or around the census years for premature deaths). However, these health measures were chosen since they provide comprehensive coverage of England and are not sample-based. The results from the 2011 Census have not been published to date. In addition, whilst I was able to example long-term economic deprivation, I have not been able to examine longitudinal health data. Thus the cross-sectional limitations of the health indicators used denies the possibility of examining health trajectories and as such identifying areas that may have been 'health resilient' over time. Moreover, I have not examined health behaviours in the identification of 'health resilience' with these health measures. Areas identified as 'health resilient' may vary if health behaviours were examined instead or in addition to the morbidity and mortality measures. The QOF results may provide an indicator of the prevalence of these factors (e.g. obesity, smoking – see Appendices 13 and 14). The QOF scores that are broken down by 'clinical domain' reports achievement by disease group type. The results indicate that the healthcare centre achieved higher points in terms of smoking, obesity and CVD compared not only to the local PCT but also better than the national average for these domains. This may suggest something about the prevalence (lower prevalences of these health-behaviour indicators in the area) or because the practice is more successfully with the services they offer, or both. However, interpretation of the

QOF indicators requires caution. Some of the caveats of QOF data include 'exception reporting' (when someone is not treated by GP e.g. if a patient refuses to attend a review they can be excluded), crude prevalence rates are used (so does not take into account demographic differences e.g. age/sex), and only one year is recorded at a time so there may be fluctuations from year to year.

Identifying 'health resilience'

Not necessarily a limitation but a third consideration relates to the method used to identify 'health resilient' areas. On reflection it may have made more sense to examine typologies of areas (e.g. urban/rural or former coalfield areas) instead of grouping all similarly deprived areas regardless of settlement type. Even though the RTC groups areas with similar levels of economic deprivation it does not take into account any other important contextual socio-historical factors. Given that protective underlying 'health resilience' may be different depending on rural/urban context it would be helpful to group these and then examine outliers within these groups.

An alternative method to the RTC and logistic regression would have been to use multilevel modelling (MLM) as a way of simultaneously identifying 'health resilience' and trying to explain findings of 'health resilience' at various spatial scales. One of the key limitations of the RTC analysis was the inability to explore wider contextual effects (i.e. of region) that may have partly explained why there were many London areas that were found to be resilient. Since the analyses were conducted separately for each spatial scale it was not possible to test for these group effects, which would have been possible in a MLM.

Moreover, the explanatory variables that were examined in the logistic regression could have also been fed into the same MLM as well as the interaction effects explored between London and some of the significant explanatory variables examined in ***Chapter 5***. This method therefore would have combined these multiple analyses that used different statistical techniques into one method. Furthermore, if I wanted to include compositional level variables to tease out contextual and compositional effects then this would have been possible in a MLM. For the purposes of this research, solely contextual/collective explanations for health resilience were examined since health resilience is conceptualised at a population rather than an individual level. Nevertheless, compositional explanations (e.g. health behaviours as mentioned in the previous section) may have contributed to explaining 'health resilience' so this may be important for future studies on 'health resilience' but it was beyond the scope of this thesis, which was primarily concerned with contextual effects.

An additional limitation was that this study examined England only. It would also be helpful to be able to examine the whole of the UK, particularly Scotland to ascertain if any areas may be identified as 'health resilient', since most studies have examined the 'Scottish (Glasgow) effect' in terms of areas performing worse than others as opposed to better. The difficulty, however, remains in obtaining consistent boundaries and data to work with.

The selection of research participants using a purposive snowballing technique also had some limitations. This was carried out mainly through word of mouth and based on participants' recommendations. While this perhaps highlights the strength of social networks within Chevington, it may have resulted in a sample

bias by not being able to reach more socially marginalised individuals. However, the sample did manage to successfully include diverse demographics (age/sex/length of residence).

Understanding 'health resilience'

One of the main limitations of this research is that there is no comparative case study. A comparative case study would have been helpful to further explore mechanisms underlying 'health resilience' in more diverse settings (particularly an urban area) or a comparison with a similar area in terms of previous coal-mining industry (such as Easington) that was not able to go on to achieve positive health outcomes. However, neither of these comparative case studies would have been feasible given the time-frame and if attempted to do these it may have resulted in cursory case studies lacking depth, which would not have been beneficial for understanding the complex processes and mechanisms underlying 'health resilience'.

Additionally, the use of administrative boundaries can be artificial and not necessarily reflect real communities. Also, residents may access services elsewhere (for example, this happened in terms of the healthcare centre in neighbouring town of Amble). There are certainly conceptual and practical problems when studying place effects on health (Boyle and Willms, 1999). Conceptually, this research decided to work with ward boundaries for the case study because these arguably better reflect local communities and neighbourhoods compared to local authority. The decision not to work with LSOAs was a practical one, since policy makers are used to working with wards and understand them better. The LSOAs within the case study were regarded to

be arbitrary, since they did not reflect the research participants' social networks or use of amenities within Chevington so it did not make sense to work with these nor did the research participants live their everyday lives within the LSOAs; therefore, the ward boundary better reflected this.

Section three

Contributions to knowledge

Academia - Health geography

As noted in ***Chapter 1***, research on 'health resilience' is limited to date with only a few studies having applied it to the area-level in England. While previous research has examined this notion at the area-level in England, this study is the only study to examine 'health resilience' at a finer scale – CASWARD and LSOA.

The previous studies on 'health resilience' in England examined either mortality or life expectancy only (with the exception of Cairns *et al*.'s 2012 study that examined morbidity measures). This study therefore captures other dimensions of health through examining both mortality and morbidity. It may also strengthen the finding of 'health resilience' if some places are found to be achieving in both outcomes and thus moves away from the argument that 'health resilience' is a mere artefact of the data and/or method used. While self-reported health measures have been found to be strong predictors of mortality, and vice versa, there is some variability, which has been demonstrated by the results from this study. Importantly, not all areas were found to be 'health resilient' in all three health measures suggesting that these do in fact capture different facets of (ill)health.

While Mitchell and colleagues (2009) conducted in-depth case studies within different regions, no previous study has explored the concept of 'health resilience' at a population level in the North East region. The research findings here complement what has been found in other case studies, which has already been discussed.

The mixed findings of social capital of being both protective for homogeneous groups but divisive by making it difficult for newcomers to integrate is important and contributes to a more critical way of conceptualising the effects of social capital on health. As mentioned previously, social capital has not always been found to have positive effects on health, or at least it has been found to have differential effects depending on the health outcome examined. This research calls for a more critical conceptualisation of social capital and how it differentially influences health. It may be that if bridging social capital is weak, integration of newer residents into a tight-knit community may have detrimental effects on health of those that are on the periphery of the community. The findings from this case study were not definitive in terms of the types of effects this had for health of the newer residents, or indeed for the long-standing community, therefore more research needs to be conducted that is able to capture these nuances and implications for health. While there is an economic case for strengthening social capital, not all forms of social capital are healthy for everyone within the community.

Contributions to public health policy

Chapter 7 reflected on the public health policy implications of the research. This research suggests that there is a need for policy makers to take a more

localised approach to tackling area-level health inequalities in England, since there are fine-scale local health variations *within* LADs. However, there needs to be a shift from a health deficit to a health asset approach. Local government should focus on the assets already available to communities and build upon these. For areas where there are local protective resources that may buffer against the ill health effects of deprivation, these need to harnessed and the local communities supported. The move of public health in England into the local authorities may facilitate this and enable a more localised and joined-up approach to improve population health. Further research into 'health resilience' can only help with this process.

Section four

Future research directions

To address the limitation of no comparative case study, more in-depth case studies are needed and comparisons between different types of areas (urban/rural) and between countries both within the UK and internationally.

In order to explore health trajectories it could be interesting to see if the areas identified as 'health resilient' in this study may still be resilient by using the 2011 Census results when they are published. It would be interesting to see how the economic crisis and ongoing welfare reforms may impact on population health.

Due to the public health reforms in the country and the local devolution of public health into local authorities, approaches to improving population health that work with local communities on the ground will be fundamentally important. Future research may benefit from working with local authorities to incorporate

an assets-based approach to promote 'health resilience' among economically deprived areas.

Concluding comments

This mixed-methods research has used statistical analysis to identify a number of 'health resilient' areas in terms of morbidity and mortality at different geographic scales in England. The results of this statistical analysis have reinforced the importance of scale in examining place effects on health. The study has also explored what is potentially protective for health in one of the 'health resilient' areas through an in-depth qualitative case study in a locality in the North East of England. The case study findings suggested that place attachment, social capital and the natural environment may be mediating factors in this particular place that has helped to reduce the conventional area-level relationship between economic deprivation and poor health. The psycho-social explanation has been particularly significant for understanding both the protective effects of social support and social networks and the negative effects of relative inequality.

This research acknowledges the limitations of the case study and argues that further qualitative research is needed to examine the protective factors operating in economically deprived areas. These findings may or may not apply in areas with different demographic, social, cultural and historical contexts. However, these findings do seem to complement findings from another study that also explored 'health resilience' at the area-level, which arguably strengthens them.

To conclude, this research adds to the emerging literature by highlighting the importance of scale in the identification of ‘health resilience’, identifying a wider range of ‘health resilient’ areas by using multiple health indicators, and by suggesting some potential protective factors that were found to be present in one ‘health resilient’ case study area. This demonstrates that poor places do not always equate to poor population health. Further research is required to explore the mechanisms behind ‘health resilient’ at the area-level and a focus on health assets.

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Appendices

Appendix 1: Regression Tree Classification (RTC) step by step description with syntax

#1: Load 'rpart' library (package required to perform regression tree classification in R software)

```
library(rpart)
```

#2: Read data into R

```
depData <- read.delim("U:/R regression tree/NEW analysis/CAS Ward
Analysis England/NGH/CASward NGH
ENG.txt",header=TRUE,row.names=1)
```

#3: Create vector for each deprivation variable

```
dep71 <- depData$"Townsend71"

dep81 <- depData$"Townsend81"

dep91 <- depData$"Townsend91"

dep01 <- depData$"Townsend01"
```

#4: Create a vector for the dependent variable (health variables – in this case Not Good Health)

```
dNGH <- depData$"NGH.SMR"
```

#5: Construct regression tree

```
fit <- rpart(dNGH ~ dep71+dep81+dep91+dep01,  method="anova")
```

#6: Plot tree

```
plot(fit, uniform=TRUE, branch=1, compress=TRUE)

text(fit, use.n=FALSE)
```

#7: Show the group membership for every observation from the first to the last

```
lfits <- as.vector(fit$where)
```

#8: Locate residuals from the regression tree, the same dimension as the original data

```
res <- residuals(fit)
```

#9: Calculate standardized residuals

```
zres <- (res-mean(res))/sd(res)
```

#10: Add the standardized residual to the original dataset

```
depData$zres <- zres
```

#11: Calculate the proportion of deprivation and mean for each group identified in the regression tree (choose to select only those that are persistently deprived (quintile '5') over 4 decades)

```
ufit <- unique(lfits)[order(unique(lfits))]

ufit

pGroup1 <- mean(rowSums(depData[lfits==ufit[1],c(11:14)]==5) == 4|
rowSums(depData[lfits==ufit[1],c(11:14)]==5) == 3)

pGroup2 <- mean(rowSums(depData[lfits==ufit[2],c(11:14)]==5) == 4|
rowSums(depData[lfits==ufit[2],c(11:14)]==5) == 3)

pGroup3 <- mean(rowSums(depData[lfits==ufit[3],c(11:14)]==5) == 4|
rowSums(depData[lfits==ufit[3],c(11:14)]==5) == 3)

pGroup4 <- mean(rowSums(depData[lfits==ufit[4],c(11:14)]==5) == 4|
rowSums(depData[lfits==ufit[4],c(11:14)]==5) == 3)

pGroup5 <- mean(rowSums(depData[lfits==ufit[5],c(11:14)]==5) == 4|
rowSums(depData[lfits==ufit[5],c(11:14)]==5) == 3)

pGroup6 <- mean(rowSums(depData[lfits==ufit[6],c(11:14)]==5) == 4|
rowSums(depData[lfits==ufit[6],c(11:14)]==5) == 3)
```

```
pGroup7 <- mean(rowSums(depData[lfits==ufit[7],c(11:14)]==5) == 4|
rowSums(depData[lfits==ufit[7],c(11:14)]==5) == 3)

pp <- c(pGroup1,pGroup2,pGroup3,pGroup4,pGroup5,pGroup6,pGroup7)
```

#12: Calculate mean of the dependent variable (Standardised Morbidity/Mortality Ratio mean) for each group

```
mGroup <- tapply(dNGH,lfits,mean)
```

#13: Combine proportion and mean together

```
pMean <- cbind(ufit,pp,mGroup)
```

#14: Use the tree and pMean to annotate the groups

In this particular example I wanted to look for low deprivation and high NGH (underachievers – not resilient) in groups 3, 5, 6 and 9; high deprivation but low NGH (overachievers - resilient) in groups 10, 12 and 13 (numbers obtained from child nodes on the regression tree (not shown). This is done by using standardised residuals: >1.96 not ‘resilient’; >-1.96 resilient.

```
#Low deprivation high not good health (ldhn) – Not resilient

ldhn <- depData[lfits==3|lfits==5|lfits==6|lfits==9,]

fldhn <- ldhn[ldhn$zres>1.96,]


#High deprivation low not good health (hdln) - Resilient

hdln <- depData[lfits==10|lfits==12|lfits==13,]

fhdln <- hdln[hdln$zres < -1.96,]

## Check for the most resilient areas
```

#15: To view the results in table

```
fix(fhdln)
```

Appendix 2: Focus group topic guide

1. **Welcome and Introduction**
   - Welcome participants and thank them for taking part
   - Introduce myself and what will be involved
   - Get consent (participants will have already read information sheet before agreeing to take part)
   - Ask participants for permission to record
   - Ground rules: listen to each other, be sensitive and respect different views, keeping to time, whatever is discussed should not be taken outside of the group, etc

2. **General experience of living in the locality**

3. **Local area and influence on health**

4. **Crime and safety**

5. **Relationships with neighbours**

6. **Social support**

7. **Local services and amenities**

8. **Access services outside the local area**

9. **Changes in the area (over past 30 years since closure of colliery)**

10. **Anything else important in terms of the local area for health and well-being?**

Appendix 3: Semi-structured interview schedule

1. **Introduction**
   - Ask to complete the consent form before we begin
   - Ask permission to record the interview and state that they can stop recording at anytime should they wish
   - Ask if they have any questions before we start?

2. **About you**
   - How long lived in the area? If not always lived here, why did you move here?

3. **Health status**
   - How would you describe your health?
   - Do you think the area you live in has an impact on your health? If so, is it a positive or a negative impact? Why?

4. **Experience and perceptions of living in the local area**
   - Do you enjoy living in the area? Why / why not?
   - Do you feel attached to the place? Why / why not?
   - Do you think you will stay in the area long-term? Why / why not?

5. **Resources/Services**
   - What do you think about the quality of healthcare services (GP, hospitals) available in the area?
   - Do you use public transport to access services/go shopping? What is public transport like?
   - Are you happy with the local amenities (shops, libraries, etc)?

6. **Education/Qualifications/Training**
   - Qualifications/Training undertaken
   - What do you think about the quality of schools in the area?
   - Are there many training courses available in the area?

7. Employment

- Are you currently employed? If so, where do you work? If not, are you looking for work?
- Do you think there are many work opportunities close by?

8. Housing

- Do you own or rent? If rent, do you rent privately or is it social housing?
- What do you think about the quality of housing and the housing services if have social housing?

9. Aspects of social capital

- Do you feel safe in the area? Is there much crime?
- Do you have many friends living in this area? (social networks)
- Do you think your neighbourhoods are friendly and willing to help each other?
- Do you participate much in social events that take place in the area? Why / why not?
- Are there any places to socialise?

10. Neighbouring areas

- Perception of surrounding areas – services, housing, etc (better or worse than this area?)
- Do you have friends that live in neighbouring areas?
- Would you prefer to live in another area? Why / why not?

<u>Closing Remarks</u>

Is there anything else like you would like to add? Anything about the area that you may think is important to health & wellbeing?

Appendix 4: Participant Information Sheet

Participant Information Sheet

You are invited to take part in this research project. Before you decide whether or not you would like to participate it is important for you to understand what the research is about and what it will involve. Please read through the following information carefully. If there is anything you do not understand or wish to ask please use the contact details provided at the end of this information sheet.

1. What is the purpose of the research?

Hi. I am Jo Cairns, a PhD researcher at Durham University, supervised by Professor Clare Bambra and Professor Sarah Curtis. The PhD research is in collaboration with the North East Public Health Observatory and is funded by the Economic and Social Research Council. The research seeks to understand the relationship between area of residence and health. The main research aim is:

- To explore residents' experience and perceptions of what features of the local area they believe are important for their health.

2. Why have I been chosen to take part in the research?

I would like to gain insights from residents that live in the **Chevington** area about what it is like to live here; which aspects of the area are beneficial or detrimental to health; and whether or not residents feel attached to the local area and why this may be. I am hoping to run several interviews with local residents (varying ages but participants must be over 18 years old).

3. What will taking part involve?

If you would like to participate you would agree to take part in a focus group and/or a one-to-one interview. Interviews and focus groups will last around 1 hour. Interviews/focus groups will be recorded with your permission. Recordings are essential to be able to transcribe the interview discussion and so not to miss anything important that is mentioned.

You will be asked to sign a consent form if you do wish to participate. This consent form will make sure you have understood what is involved and that your information will be kept confidential. You are free to withdraw from the research at any time should you wish.

4. What are the possible benefits of taking part in the research?

You will be contributing to understandings of which features of the local area are beneficial or detrimental to health which may help to inform academics and policy-makers working in this field of research.

As a thank you, you will receive a £10 shopping voucher (of your choice) upon completion of an interview/focus group. If any costs are incurred as a result of taking part in the research (e.g. travel costs) this will also be reimbursed.

5. What will happen with the information?

All information that is collected during the course of this research will be anonymous and kept confidential. Supervisors may request to see interview transcripts; however your personal details will be removed from the transcript so you will not be identifiable.

6. What will happen to the research findings?

The information collected in the interviews will be used in the PhD thesis; in reports to the PhD case partner (the North East Public health Observatory); in conference presentations; and in any publications that emerge from the research. All information will be anonymous in these disseminations.

7. Who funds the research?

This research is jointly funded by the Economic and Social Research Council (ESRC) and the North East Public Health Observatory (NEPHO). You can find details of these organisations at the following respective websites: http://www.esrc.ac.uk/ and http://www.nepho.org.uk/.

8. If I decide to take part, what happens next?

If you like what you have heard and are happy to take part in this research please contact me via the following means: Phone/text/email me on **07866756857** or j.m.cairns@durham.ac.uk. When contacting me please provide the following details: your name, age and contact details. I will then get in touch with you to arrange a mutually convenient time to meet.

~Thank you for your time~

Contact Details

Jo Cairns, Durham University, Department of Geography, South Road, Durham, DH1 3LE

Tel: 07866756857 or 0191 3340252 / 0191 3341817

Email: j.m.cairns@durham.ac.uk

Appendix 5: Participant Consent Form

Participant Consent Form

(To be completed after reading the Participant Information Sheet)

Please tick

- I understand that I have been invited to take part in this research and that the purpose of the research has been explained to me to my satisfaction. ☐
- I have read through the participant information sheet and understand what taking part in this research will involve. ☐
- I have had the opportunity to ask questions about my participation in the research. ☐
- I have not been forced to participate in this research and I understand I am under no obligation to take part. ☐
- I am aware that the researcher may ask for permission to record discussions or interviews and that it is my decision whether or not I agree to be recorded and that if I agree to this I can ask to stop recording at any point if I wish. ☐
- I understand that I am free to withdraw from the research at any time should I wish. ☐
- I understand that all information I provide will be treated with confidence and will be kept anonymous and confidential. ☐
- I understand that any personal information stored on a computer will comply with the 1998 Data Protection Act and that this information will not be passed on to anyone else. ☐
- I understand that findings from this research including any information I provide may be used in publications and presentations during the PhD research and in the future. ☐
- I agree to participate in this study given the details outlined above. ☐

Name (please print): …….....

Signature: ……..... .....
Date…….....

Contact telephone number: .....

Appendix 6
England Ward-Level Regression Tree Classification for Not Good health (NGH)

Grp	P	*N*	SMR Mean	Std.Res > +1.96	Std.Res < -1.96
1	0	3254	66.70	00BWFU,00BWFZ,00CFFD,00EUNE,13UBGQ,16UFHA,17UCGB,20UHGD, 22UNGS,30UEGC,30UFGG,30UGGJ,30UNGD,30UNGN,30UNGS,30UQGM, 30UQGW,30UQHA,32UCHH,32UCJN,32UCJZ,32UCKD,32UFGT,32UFGW, 33UEHN,35UEFZ,37UCHB,37UDGF,37UDGK,37UFGE,41UHGM,41UHGX	43UGFY
2	0	1404	81.62	00BQFQ,00ECNJ,00EXNL,00EYMZ,00EYNF,15UGGJ,16UCGA,16UCGC, 17UKFX,21UHHD,23UEGC,30UEGK,30UGGD,30UGGG,30UHHL,35UDGQ, 35UDHJ,37UBFW,37UBGE,37UBGG,37UFGH	11UEGL,11UFGL,12UBFZ,24UPHD
3	0	1092	94.62	00BCGE,00BPFS,00BWFE,00BWFG,00BWFJ,00BZFQ,00CCFU,00EHNC, 00EYNG,00EYNJ,00EYNK,00EYNT,00GLNJ,15UDGJ,16UCFW,17UBGR, 17UCGF,17UCGG,17UCGH,17UCGL,17UDFY,17UJHB,17UKGF,19UJFQ, 21UDFT,22UNGL,22UNGU,22UNHN,30UDHA,30UGGB,30UGGF,30UHGQ, 30UJGB,30UJGH,30UKGE,30UNGL,30UQHB,32UCHF,33UEHE,35UDHE,36 UHGU,37UFFX,37UFGA,37UFGL,37UGGL,37UGHD,41UBGC,42UHGG, 44UCFU	00BDGH,00BDGJ,00MBPA,00MENL,19UEHG,19UHHZ,23UCHH,23UCHN, 24UBJN,24UPHC,29UQGF,35UFGR,35UFHK,38UCGA,38UFGU,43UKFY, 46UBHM,46UDGR
4	0.01	628	105.81	00BNFJ,00BRFM,00BWFK,00BYGJ,00BZFB,00BZFF,00CCFD,00CCFP, 00CCFT,00GLNF,00GLNS,16UCFU,16UCGB,17UBGT,17UBGY,17UCGD, 17UCGE,17UJGR,20UFGK,20UHGE,21UDGG,29UMGN,30UJGM,30UJGP, 30UMFZ,30UMGD,30UNGJ,30UQGY,32UCHU,32UCHW,35UGGG,37UFFW 37UGGM	00AGGJ,00APGG,00AWGP,00BKGH,00CJFM,00GFPQ,00HBNW,00HBNX0 0HBNY,00HNNJ,00KAMU,00KGNA,13UBGN,13UDGQ,13UGGT,20UEGL22 UBFX,23UBFY,24UFFW,26UGGM,32UGHQ,33UBHA,35UBGD,35UBGF35U FGM,35UFHP,36UEGN,36UGGY,38UCGD,38UCGQ,46UDHA
5	0.61	697	122.32	00BBGQ,00BNFY,00BWFA,00BWFP,00BZFM,00BZFR,00CCFE,00CCFF, 00CCFY,00CEFN,00CXGA,00DBFC,00DBFE,00DBFF,00DBFN,00DBFP, 00EBMJ,00EYNC,00EYND,00FANB,,00GLNA,00GLNC,16UCFQ,16UCFX, 16UCFZ,17UCGJ,17UCGM,17UCGS,20UFGE,20UFGN,20UFGQ,20UFGS, 20UFGZ,20UGGP,30UDGQ,30UGFX,30UGFY,30UGGK,30UJGQ,30UQGU, 35UDGX,37UBFY,37UCGR,37UGGS,41UBFY,41UEGH	00AJGG,00ANGH,00APGD,00ATGT,00AWFY,00AWFZ,00AWGA,00AWGG, 00AWGH,00AWGM,00AWGR,00BJFZ,00BJGC,00BJGH,00BJGJ,00BJGP, 00BJGQ,00BJGS,00BKGA,00EHNJ,00FANF,00FFNR,00FNPD,00GFNM, 00HNMY,00MCMZ,00MGNX,00MRNC,11UBGS,11UBHA,12UBFY,13UBGM, 15UH,16UEHA,16UGHT,17UHGX,18UDGU,20UEGU,23UBGC,26UFGU, 26UHFQ,31UGGC,31UHGD,35UFGZ,36UEHB,38UCFW,38UCGC,38UCGG, 38UCGK,38UCGR,41UEGJ,42UFHA,46UBHB,46UDHL,47UBGP
6	0.89	608	140.68	00BNGC,00BPFJ,00BRFJ,00BWFM,00BWFT,00BYFL,00BYGC,00BZFC, 00BZFL,00BZFS,00CBFC,00CBFW,00CCFC,00CCFH,00CCFJ,00CEFJ, 00CFFH,00DBFA,00EBMC,00ETNC,00ETNU,00EXNA,00EXNS,00EXNX, 00EYNB,00GLMY,17UCGN,17UCGP,17UDGJ,20UBFU,20UBGH,20UDGM, 20UFGD,20UFGG,20UFGJ,20UFGL,20UFGM,20UFGP,20UFGY,20UGGK, 30UDGW, 30UJFZ,30UJGR,30UKGP,30UPGH,37UCHF	00AB,00AGGD,00AGGF,00AGGH,00AGGW,00ALGY,00ANGC,00ANGL, 00ANGM,00ANGQ,00AWGC,00AWGJ,00AWGL,00AWGN,00AYGB,00AYGC 00AYGP,00BEGX,00BJGA,00BJGD,00BJGM,00BJGN,00BJGT,00BKGC, 00BKGG,00BKGK,00BKGM,00BKGQ,00BKGR,00BKGS,00BKGT,00BKGW, 00BXFC,00DAFN,00FANT,00HNNN,00KFMW,00MGNP,00MLNE,00MLNR, 09UDGQ,09UDGW,12UEGZ,22UJFZ,29ULGJ,32UDFW,35UCFX,35UCGF, 35UCGH38UCGP,41UDGM,42UFHN,47UBGS,47UEGC,47UEGD
7	1	259	162.39	00BNFD,00BNFU,00BXFA,00BXFF,00BXFH,00BXFJ,00BXFP,00BXFU, 00BYFF,00BYFQ,00BYFT,00BYFW,00BYGB,00BYGD,00BYGE,00BYGH, 00CAGL,00CBFB,00CFFL,00CNGH,00CXFS,00ECNT,00ECPA,00EEND, 00EXMZ,17UHGM,20UFGH	00AGGE,00ANGD,00ANGJ,00ANGP,00AWGE,00AYFZ,00AYGA,00AYGE, 00AYGG,00AYGJ,00AYGK,00AYGL,00AYGN,00AZGF,00BEGC,00BEGE, 00BEGF,00BEGS,00BEGU,00BGGJ,00BKGB,00BKGJ,00MSMR

England Ward-Level Regression Tree Classification for Limiting Long-Term Illness (LLTI)

Grp	P	*N*	SMR Mean	Std.Res > +1.96	Std.Res < -1.96
1	0	3254	75.85	00BWFU,00BWFZ,00CFFD,00CMFE,00EBMH,20UDGF,22UNGS,30UEFZ30UFGG,30UFGW,30ULGU,30UNGD,30UNGN,30UNGS,30UPGG,30UPGT,30UPGX,30UQGH,30UQGM,30UQGW,30UQHA,32UCHH,32UCJN,32UCJZ,32UCKD,33UEHN,35UEFZ,37UCHB,37UDGF,37UDGK37UFGE,41UHGM,41UHGZ	00MEMZ,11UCGN,11UEGJ,24UBHZ,24UGGA,43UBGN,43UGFY,43UJGE,43UKGT
2	0	1101	85.50	00BLFS,00ECNJ,00EXNL,00EYNF,00EYNQ,00HGNF,00MWQD,15UFFT,16UCGA,17UKFX,23UEGC,30UEGK,32UCJS,35UDGQ,35UDHJ,35UGGJ,37UBFX,37UBGG,37UFGH	00BAGQ,11UEGL,11UFGL,12UBFZ,24UGGG,24UPHD, 43UDGN
3	0	1395	95.06	00BWFE,00BWFG,00BWFJ,00BWFL,00BZFQ,00CEFB,00EYNG,00EYNJ,00EYNT,00GLNJ,15UDGJ,15UEGH,16UCGC,17UCGF,17UCGG,17UCGL17UDFY,17UKGF,19UJFQ,22UNGL,22UNGU,22UNHN,30UGGB,30UGGD,30UGGF,30UHGQ,30UJGB,30UQHB,32UCHF,33UEHE,35UDHE,37UCGG,37UFFX,37UFFZ,37UFGA,37UFGF,37UFGL,37UGGL,37UGHD,41UBGC	00AXGL,00BDGE,00BDGH,00BDGJ,00BDGM,00MBNU,00MENL,16UGKA,19UEHG,23UCHH,23UCHN,24UBHW,24UBJN,24UPGL,24UPHC,29UQGF,35UFGR,38UFGU,43UKFY,45UDHC, 46UDHH
4	0	628	103.70	00BNFJ,00BWFK,00BYGJ,00BZFB,00BZFF,00CBFH,00CCFD,00CCFT,00GLNF,00GLNP,00GLNS,16UCFU,16UCGB,17UBGY,17UCGD,17UCGK,17UCGX,17UJGR,20UFGK,20UHGE,20UJGF,29UMGN,30UHGS,30UJGM,30UMFZ,32UCHU,32UCHW,32UCJK,32UCJX,35UGGG,37UFFW,37UGGM	
5	0.45	697	115.30	00BWFA,00BZFG,00BZFM,00BZFR,00CCFA,00CCFF,00CCFW,00CEFN,00DBFE,00DBFF,00DBFN,00DBFP,00EBMA,00EBMJ,00EENG,00EYNC,00EYND,00GLNA,16UCFQ,16UCFX,16UCFZ,17UCGJ,17UCGM,17UCGS,20UBGB,20UFGE,20UFGN,20UFGQ,20UFGS,20UFGZ,20UGGP,30UDGQ,30UGFX,30UGFY,30UGGK,35UDGX,35UGFZ,37UBFY,37UCGR,37UFFY,37UFGG,37UFGJ,37UFGN,37UGGS,41UBFY,41UEGH	00AJGG,00ANGH,00APGD,00ATGT,00AWFY,00AWFZ,00AWGA,00AWGG,00AWGH,00AWGM,00AWGR,00BJFZ,00BJGC,00BJGH,00BJGJ,00BJGP,00BJGQ,00BJGS,00BKGA,00BKGP,00EHNJ,00FFNR,00FNPD,00GFNM,00HNMY,00MCMZ,00MDMW,00MGNX,00MRNC,11UBHA,12UBFY,13UBGM,15UH,16UEHA,20UEGU,23UBGC,26UHFQ,31UHGD,36UGGW,38UCFW,38UCGF,38UCGK,38UCGR,41UEGJ,42UFHA,46UBHB,46UDHL,47UBGP
6	0.9	867	131.00	00BLFG,00BNFD,00BNFU,00BQFP,00BRFJ,00BRFL,00BWFM,00BWFT,00BXFA,00BXFB,00BXFF,00BXFH,00BXFJ,00BXFP,00BXFU,00BXFY,00BYFF,00BYFK,00BYFP,00BYFQ,00BYFT,00BYFW,00BYFX,00BYFY,00BYGB,00BYGC,00BYGD,00BYGE,00BYGH,00BZFC,00BZFS,00CAGL,00CBFB,00CBFC,00CBFT,00CBFW,00CCFH,00CCFJ,00CFFL,00CHFA,00CJFQ,00CJFX,00CMFU,00CMFX,00CNGH,00EBMC,00EBMK,00EBMR,00ECNQ,00ECNT,00ECPA,00EEND,00ETNC,00ETNU,00EXMZ,00EXNS,00GLMY,17UCGN,17UCGP,20UBFU,20UDGM,20UFGD,20UFGF,20UFGH,20UFGJ,20UFGL,20UFGM,20UFGP,20UFGY,20UGGQ,20UJGS,30UDGW,30UPGM,37UCHF	00AB,00AEGL,00AEGU,00AEGY,00AGGD,00AGGE,00AGGF,00AGGH,00AGGW,00AGGX,00ALGY,00ANGA,00ANGC,00ANGL,00ANGM,00ANGN,00ANGQ,00APGP,00AWGC,00AWGE,00AWGJ,00AWGL,00AWGN,00AYFZ00AYGB,00AYGC,00AYGK,00AYGP,00AYGS,00AZGF,00BEGE,00BEGS,00BEGW,00BEGX,00BGGG,00BGGJ,00BJGA,00BJGD,00BJGK,00BJGM,00BJGN,00BJGT,00BKGB,00BKGC,00BKGG,00BKGJ,00BKGK,00BKGL,00BKGM, 00BKGQ,00BKGR,00BKGS,00BKGT,00BKGW,00DAFN,00FANT,00HNNN,00KFMW,00MGNP,00MLND,00MLNE,00MLNR,09UDGQ,12UEGZ22UJFZ,32UDFW,35UCFX,35UCGH,35UEFY,38UCGP,42UFHN,47UBGS,47UEGC,47UEGD

England Ward-Level Regression Tree Classification for Premature Mortality <75 (Deaths)

Grp	P	*N*	SMR Mean	Std.Res > +1.96	Std.Res < -1.96
1	0	3423	75.58	00EFNF,00EHNU,00EUNE,00EXNE,00GFNZ,00GFPC,00MANC, 11UCGR,13UBGW,13UBGZ,13UHHB,16UBHS,16UFGY,16UFHJ,17UHGG, 17UKGC,20UHGH,20UJGE,22UNGP,22UNGS,22UQGL,23UFGU,23UFGY, 24UCHT,24UCHU,29UEGL,29UEGR,29UMGL,29UPHP,30UEGR,30UFGK, 30UFGN,30UGGJ,30UKFW,30ULGG,30UNGD,30UPHE,30UQGW,31UDGJ, 32UEHA,32UFGD,33UHHK,34UEGF,36UCGW,36UHGR,36UHGT,37UDGF, 37UEGB, 38UBGZ,38UDHG,39UDFY,40UCGJ,41UDGX,41UHGT,42UEHD, 42UFHD,42UHGK,43UEGX,44UDGA,46UBGP,47UBGQ,47UFHG	00FPMZ,00FPNJ,00MANM,11UCGT,13UGHE,18UGHH,19UEHD,19UGGB, 22UKGM,23UCHJ,31UDGF,31UDGQ,32UHGY,34UCGJ,35UFGN,38UBGU, 38UFHE,40UFGL,41UEGJ,41UFJB, 41UFJG,42UEGM,46UFGX
2	0	2047	91.33	00ASGN,00BPFT,00BSFQ,00BTFS,00BWFQ,00CKFL,00CKFW,00ETNL, 00EYNK,00EYNP,00GFPD,00GFPR,00GLNJ,00HCPY,12UDGK,12UEGZ, 13UBGT,13UHHP,16UBHU,16UFHC,17UCGH,17UCGK,17UHHE,17UKFX, 17UKGF,20UDGJ,20UDGY,20UFGK,20UGGK,22UNHM,24UBJM,30UDGU, 30UGGA,30UGGB,30ULGR,30UNGZ,30UQGT,30UQHF,31UHGG,32UEHB, 32UEHL, 33UBHX,37UBFR,37UGGL,37UGGM,38UCGG,41UEGB,42UBGS, 43UFGD	00BAGQ,00FFNR,00FPNB,00GAPT,11UBHA,12UBFZ,13UHHF,15UCGM, 16UGHG,16UGJF,17UFGN,18UGGS,18ULGC,19UGFP,20UHGL,23UCHC, 23UCHN,29UBHE,29UMGH,33UBHL,33UEHC,33UFHF,35UCFZ,36UCHR, 38UEHF,39UFGZ,40UEHG,40UFGJ,42UBGL,43UDGH,45UDHC,46UDHA, 47UGFU
3	0	833	107.4	00EHNC,00EHNL,00EHNY,00EXND,00EYNT,00HBPT,00HCPQ,00KFMT, 00MGNZ,13UDGL,13UDGZ,13UGHM,13UGHQ,13UHHN,16UBHH,16UDGG 16UEGX,17UHHG,20UJFY,22UHHQ,22UNHL,23UEFY,24UBJN,24UCGL, 29UMGN,29UNGM,30UDHD,30UGGF,30UHGZ,32UBGG,33UDGC, 35UFGW,37UEGK,37UJHJ, 45UCHB	00ACGF,00ADGP,00AEGS,00AEGW,00AJGM,00AQGJ,00ATGB,00BAGB, 00BCFZ,00BKGH,21UGGR,29UCGU,38UCGQ, 46UCHA
4	0.44	883	121.2	00APGC,00BNFX,00BNFY,00BYFD,00CMFW,00DBFT,00EFNC,00EHND, 00EUNG,00EXNN,00EYNC,00EYND,00EYNR,00EYNW,00FCND,00FNNL, 00GLNC,00MGPA,13UBGL,13UDGN,16UCFQ,16UCFU,17UCGN,17UHGN, 18UEGX,21UDFZ,29UEHA,29UEHC,29UNGP,30UDGQ,30UDGW,30UDHE, 30UGFX,30UGGK, 30UJGQ,30UJGR,30UQGY,37UGGS	00ACGS,00AEHD,00AGGD,00AGGJ,00AGGL,00ANGM,00APGD,00AWFY, 00AWFZ,00AWGA,00AWGG,00AWGH,00AWGM,00AWGP,00AWGR, 00BKGA,00BKGC,00BKGP,12UBFY,12UBGA,15UH,18UDGU,26UFGU, 33UDGQ,33UGFU,38UCGD,38UCGK, 42UDFX,42UDGJ,46UDGS
5	0.94	756	141.8	00BKGE,00BLFG,00BLFK,00BNFA,00BNFD,00BNFE,00BNFG,00BNFK, 00BNFM,00BNFU,00BNFW,00BNFZ,00BNGA,00BNGC,00BPFA,00BQFD, 00BRFB,00BRFC,00BRFJ,00BRFL,00BRFN,00BXFJ,00BXFP,00BYFA, 00BYFQ,00BYFT,00BYGD,00BYGH,00BZFL,00CAGL,00CBFB,00CBFC, 00CBFW,00CHFA,00CHFB,00CJFC,00CJFG,00CJFZ,00CLFC,00CMFB, 00CSFU, 00DAFH,00EBMN,00EBMP,00EBMR,00ECNF,00ECNH,00ECNT, 00EEND,00EFMW,00ETNT,00ETNU,00EXNX,00EYNB,00FANL,00FANR, 00FKNA,00FYNL,00FYNX,00HBPM,00MSMT,17UHGM,20UBFZ,30UKGN, 30UKGP,33UDGK,34UBFQ,37UFGM	00AB,00ABFX,00ACFY,00AEGL,00AEGY,00AGGH,00AGGW,00AMGM, 00AMGP,00ANGA,00ANGC,00ANGL,00ANGQ,00ANGR,00APGN,00AWGC 00AWGD,00AWGE,00AWGJ,00AWGL,00AWGN,00BEGS,00BEGW, 00BEGX,00BGGJ,00BJGD,00BKGG,00BKGJ,00BKGK,00BKGL,00BKGM, 00BKGQ,00BKGR,00BKGT,00BKGW,00CKFA,00CLFJ,00CLFU,00CTFF, 00CWFU,00CZFB,00DAFN,00ECNZ,00EENL,00FANU,00FNPA,00HBPD, 00HNNN,20UDGL, 29UEGJ,33UGFZ,34UBFS,34UHFT,35UEFY,36UHHD

Appendix 7:

List of 'health resilient' areas for self-reported not good health

CASWARD CODE	CASWARD NAME	Region
00AB	City of London	London
00AGGD	Belsize	London
00AGGE	Bloomsbury	London
00AGGF	Camden Town with Primrose	London
00AGGH	Fortune Green	London
00AGGW	Swiss Cottage	London
00AJGG	Ealing Common	London
00ALGY	Greenwich West	London
00ANGC	Avonmore and Brook Green	London
00ANGD	College Park and Old Oak	London
00ANGH	Munster	London
00ANGJ	North End	London
00ANGL	Parsons Green and Walham	London
00ANGM	Ravenscourt Park	London
00ANGP	Shepherd's Bush Green	London
00ANGQ	Town	London
00APGD	Crouch End	London
00ATGT	Turnham Green	London
00AWFY	Abingdon	London
00AWFZ	Brompton	London
00AWGC	Courtfield	London
00AWGE	Earl's Court	London
00AWGG	Hans Town	London
00AWGH	Holland	London
00AWGJ	Norland	London
00AWGL	Pembridge	London
00AWGM	Queen's Gate	London
00AWGN	Redcliffe	London
00AWGR	Stanley	London
00AYFZ	Bishop's	London
00AYGA	Brixton Hill	London
00AYGB	Clapham Common	London
00AYGC	Clapham Town	London
00AYGE	Ferndale	London
00AYGG	Herne Hill	London
00AYGJ	Larkhall	London
00AYGK	Oval	London
00AYGL	Prince's	London
00AYGN	Stockwell	London
00AYGP	Streatham Hill	London
00AZGF	Brockley	London
00BEGC	Brunswick Park	London
00BEGE	Cathedrals	London
00BEGF	Chaucer	London
00BEGS	Riverside	London
00BEGU	South Bermondsey	London
00BEGX	Surrey Docks	London
00BGGJ	St Katherine's and Wapping	London

00BJFZ	Balham	London
00BJGA	Bedford	London
00BJGC	East Putney	London
00BJGD	Fairfield	London
00BJGH	Nightingale	London
00BJGJ	Northcote	London
00BJGM	St Mary's Park	London
00BJGN	Shaftesbury	London
00BJGT	West Hill	London
00BKGA	Abbey Road	London
00BKGB	Bayswater	London
00BKGC	Bryanston and Dorset Square	London
00BKGG	Hyde Park	London
00BKGJ	Lancaster Gate	London
00BKGK	Little Venice	London
00BKGM	Marylebone High Street	London
00BKGQ	St James's	London
00BKGR	Tachbrook	London
00BKGS	Vincent Square	London
00BKGT	Warwick	London
00BKGW	West End	London
00DAFN	Headingley	Yorkshire & Humber
00HNMY	Central	South West
00KFMW	Milton	East of England
00MLNE	Central Hove	South East
00MLNR	Regency	South East
00MRNC	St Jude	South East
00MSMR	Bargate	South East
09UDGQ	Harpur	East of England
09UDGW	Kingsbrook	East of England
12UBFY	Market	East of England
22UJFZ	Netteswell	East of England
42UFHN	St Olaves	East of England
29ULGJ	Folkestone Harvey Central	South East
32UDFW	Minster	East Midlands
35UCFX	Edward	North East
35UCGF	Prior	North East
38UCFW	Carfax	South East
38UCGC	Hinksey Park	South East
38UCGP	St Clement's	South East
38UCGR	St Mary's	South East
41UDGM	Chadsmead	West Midlands

List of ‘health resilient’ areas for limiting long-term illness

CASWARD CODE	CASWARD NAME	Region
00AB	City of London	London
00AEGL	Brondesbury Park	London
00AEGU	Mapesbury	London
00AEGY	Queens Park	London
00AGGD	Belsize	London
00AGGE	Bloomsbury	London
00AGGF	Camden Town with Primrose	London
00AGGH	Fortune Green	London
00AGGW	Swiss Cottage	London
00AGGX	West Hampstead	London
00AJGG	Ealing Common	London
00ALGY	Greenwich West	London
00ANGA	Addison	London
00ANGC	Avonmore and Brook Green	London
00ANGH	Munster	London
00ANGL	Parsons Green and Walham	London
00ANGM	Ravenscourt Park	London
00ANGN	Sands End	London
00ANGQ	Town	London
00APGD	Crouch End	London
00APGP	Stroud Green	London
00ATGT	Turnham Green	London
00AWFY	Abingdon	London
00AWFZ	Brompton	London
00AWGC	Courtfield	London
00AWGE	Earl's Court	London
00AWGG	Hans Town	London
00AWGH	Holland	London
00AWGJ	Norland	London
00AWGL	Pembridge	London
00AWGM	Queen's Gate	London
00AWGN	Redcliffe	London
00AWGR	Stanley	London
00AYFZ	Bishop's	London
00AYGB	Clapham Common	London
00AYGC	Clapham Town	London
00AYGK	Oval	London
00AYGP	Streatham Hill	London
00AYGS	Thornton	London
00AZGF	Brockley	London
00BEGE	Cathedrals	London
00BEGS	Riverside	London
00BEGW	South Camberwell	London
00BEGX	Surrey Docks	London
00BGGG	Millwall	London
00BGGJ	St Katherine's and Wapping	London
00BJFZ	Balham	London

00BJGA	Bedford	London
00BJGC	East Putney	London
00BJGD	Fairfield	London
00BJGH	Nightingale	London
00BJGJ	Northcote	London
00BJGK	Queenstown	London
00BJGM	St Mary's Park	London
00BJGN	Shaftesbury	London
00BJGT	West Hill	London
00BKGA	Abbey Road	London
00BKGB	Bayswater	London
00BKGC	Bryanston and Dorset Square	London
00BKGG	Hyde Park	London
00BKGJ	Lancaster Gate	London
00BKGK	Little Venice	London
00BKGL	Maida Vale	London
00BKGM	Marylebone High Street	London
00BKGP	Regent's Park	London
00BKGQ	St James's	London
00BKGR	Tachbrook	London
00BKGS	Vincent Square	London
00BKGT	Warwick	London
00BKGW	West End	London
00DAFN	Headingley	Yorkshire & Humber
00HNMY	Central	South West
00KFMW	Milton	East of England
00MLND	Brunswick and Adelaide	South East
00MLNE	Central Hove	South East
00MLNR	Regency	South East
00MRNC	St Jude	South East
00MSMR	Bargate	South East
09UDGQ	Harpur	East of England
12UBFY	Market	East of England
22UJFZ	Netteswell	East of England
32UDFW	Minster	East Midlands
35UCFX	Edward	North East
35UEFY	Chevington	North East
38UCFW	Carfax	South East
38UCGF	Jericho and Osney	South East
38UCGP	St Clement's	South East
38UCGR	St Mary's	South East
42UFHN	St Olaves	East of England

List of 'health resilient' areas for premature deaths

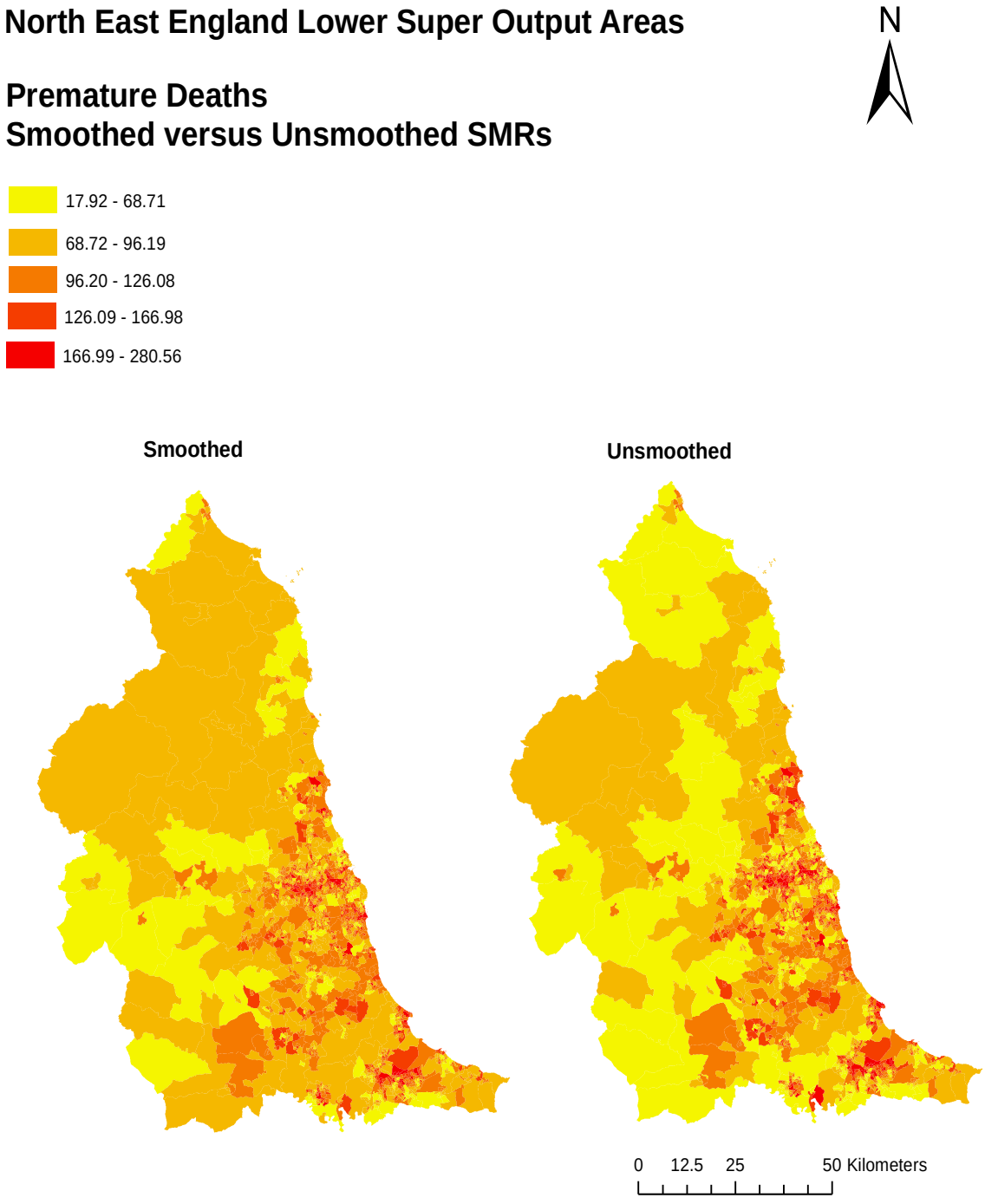
CASWARD CODE	CASWARD NAME	Region
00AB	City of London	London
00ABFX	Abbey	London
00ACFY	Burnt Oak	London
00AEGL	Brondesbury Park	London
00AEGY	Queens Park	London
00AGGD	Belsize	London
00AGGH	Fortune Green	London
00AGGL	Hampstead Town	London
00AGGW	Swiss Cottage	London
00AMGM	Leabridge	London
00AMGP	New River	London
00ANGA	Addison	London
00ANGC	Avonmore and Brook Green	London
00ANGL	Parsons Green and Walham	London
00ANGM	Ravenscourt Park	London
00ANGQ	Town	London
00ANGR	Wormholt and White City	London
00APGD	Crouch End	London
00APGN	Seven Sisters	London
00AWFY	Abingdon	London
00AWFZ	Brompton	London
00AWGC	Courtfield	London
00AWGD	Cremorne	London
00AWGE	Earl's Court	London
00AWGG	Hans Town	London
00AWGH	Holland	London
00AWGJ	Norland	London
00AWGL	Pembridge	London
00AWGM	Queen's Gate	London
00AWGN	Redcliffe	London
00AWGR	Stanley	London
00BEGS	Riverside	London
00BEGW	South Camberwell	London
00BEGX	Surrey Docks	London
00BGGJ	St Katherine's and Wapping	London
00BJGD	Fairfield	London
00BKGA	Abbey Road	London
00BKGC	Bryanston and Dorset Square	London
00BKGG	Hyde Park	London
00BKGJ	Lancaster Gate	London
00BKGK	Little Venice	London
00BKGL	Maida Vale	London
00BKGM	Marylebone High Street	London
00BKGP	Regent's Park	London
00BKGQ	St James's	London
00BKGR	Tachbrook	London
00BKGT	Warwick	London

00BKGW	West End	London
00CLFJ	Harton	North East
00CTFF	Kingshurst	West Midlands
00CZFB	Batley East	Yorkshire & Humber
00DAFN	Headingley	Yorkshire & Humber
00EENL	Newcomen	North East
00FNPA	Stoneygate	East Midlands
12UBFY	Market	East of England
29UEGJ	Aylesham	South East
33UDGQ	Yarmouth North	East of England
33UGFZ	Mile Cross	East of England
35UEFY	Chevington	North East
36UHHD	Selby South	Yorkshire & Humber
42UDFX	Gainsborough	East of England
46UDGS	Bemerton	South West

Appendix 8: Comparison of smoothed and unsmoothed health indicators

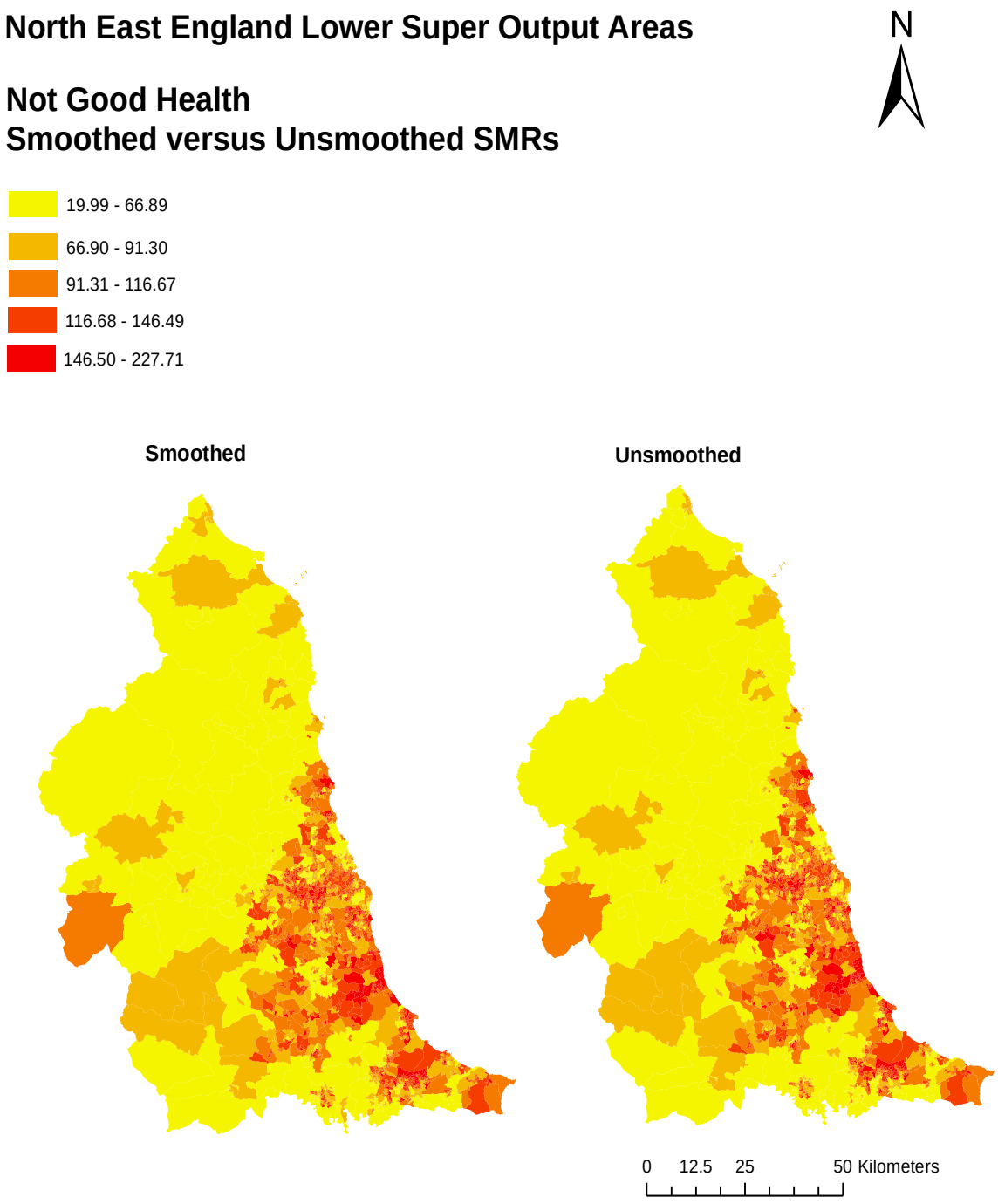
Comparison of unsmoothed versus smoothed SMRs at LSOA level

(Premature deaths)



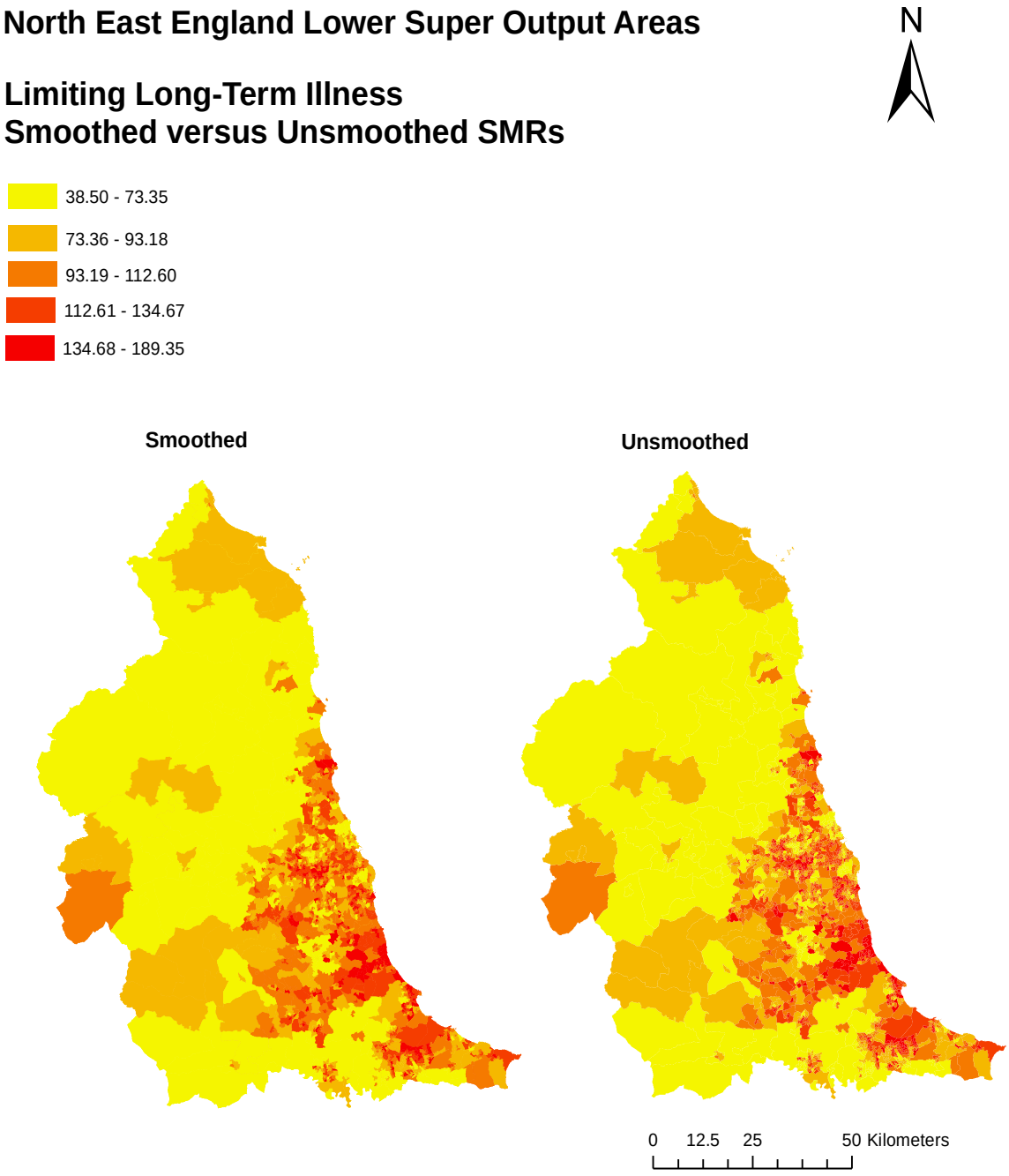
Comparison of smoothed versus unsmoothed SMRs at LSOA level

(Not Good Health)



Comparison of smoothed versus unsmoothed SMRs at LSOA level

(Limiting Long-Term Illness)



Appendix 9: LSOA Tables

RTC results at LSOA level (limiting long-term illness)

Grp	P	*N*	SMR Mean	Std.Res > +1.96	Std.Res < -1.96
1	0	434	73.47	Sunderland 030C, Easington 010D	Darlington 015D, Alnwick 001B
2	0	372	90.78	Sunderland 035E, Derwentside 007F, Durham 012A, Easington 009C, Easington 002A, Easington 011E, Easington 005A, Easington 005C, Easington 007A, Easington 008B, Easington 004B, Easington 013C, Sedgefield 002E	Newcastle upon Tyne 013A, Newcastle upon Tyne 013B, Newcastle upon Tyne 017C, Middlesbrough 019C, Darlington 001A, Durham 007B, Durham 001A, Durham 007C, Sedgefield 009E, Tynedale 001B, Tynedale 004B, Wansbeck 008D
3	0	252	106.1	Derwentside 005C, Easington 011D, Easington 007B, Easington 007D, Easington 008D, Easington 009E, Easington 012A, Easington 012B	Newcastle upon Tyne 018F, Newcastle upon Tyne 017A, Newcastle upon Tyne 013D, Newcastle upon Tyne 017E, North Tyneside 006A, South Tyneside 003C, Durham 007A
4	0.15	202	116.3	Easington 009B, Easington 011A, Easington 006A, Easington 005B, Easington 006B, Easington 008A, Easington 008C, Easington 010C , Easington 013B, Sedgefield 002A	Newcastle upon Tyne 024A, Newcastle upon Tyne 024C, Middlesbrough 011A, Stockton-on-Tees 010C, Darlington 008D, Berwick-upon-Tweed 001C, Tynedale 004F
5	0.87	250	123.2	Gateshead 011A, Easington 003D, Easington 006D, Easington 006E, Easington 007C, Easington 006F, Easington 012C	**Newcastle upon Tyne 029C**, Newcastle upon Tyne 019D, Newcastle upon Tyne 022A, **Newcastle upon Tyne 023C**, South Tyneside 018A, South Tyneside 007D, Berwick-upon-Tweed 001A
6	1	146	136.1	Gateshead 006D, Gateshead 021E, Redcar and Cleveland 009B	**Newcastle upon Tyne 026B**, **Newcastle upon Tyne 022B**, **South Tyneside 002A**, Middlesbrough 003D

RTC results at LSOA level (premature deaths)

Grp	P	*N*	SMR Mean	Std.Res > +1.96	Std.Res < -1.96
1	0	444	74.05	Gateshead 022D, Sunderland 002E, Middlesbrough 009B, Redcar and Cleveland 007D, Stockton-on-Tees 001B, Stockton-on-Tees 001E, Darlington 015D	-
2	0	440	93.52	Newcastle upon Tyne 017D, North Tyneside 014A, North Tyneside 017A, South Tyneside 003C, Sunderland 027C, Middlesbrough 009E, Redcar and Cleveland 007C, Darlington 012C, Easington 002D, Sedgefield 002E	Middlesbrough 019C
3	0.05	326	109.34	Gateshead 013C, Gateshead 004E, Newcastle upon Tyne 027A, Newcastle upon Tyne 026A, North Tyneside 030D, North Tyneside 006A, Sunderland 011B, Sunderland 035B, Sunderland 024D, Sunderland 032D, Middlesbrough 011A, Redcar and Cleveland 011A, Chester-le-Street 004E, Derwentside 006E, Easington 002F, Wear Valley 004D, Castle Morpeth 001E, Wansbeck 007D	North Tyneside 018D, South Tyneside 006A, Derwentside 011A, Durham 006C, Wansbeck 008D
4	0.70	232	122.22	Gateshead 006C, Gateshead 008A, Gateshead 021A, North Tyneside 022B, North Tyneside 028C, North Tyneside 028D, Sunderland 013D, Hartlepool 003A, Hartlepool 010B, Hartlepool 002E, Stockton-on-Tees 003D, Stockton-on-Tees 017B, Derwentside 005D, Easington 006C	Gateshead 022B, Newcastle upon Tyne 018D, Newcastle upon Tyne 022A, **South Tyneside 011D, South Tyneside 002B**, Sunderland 004C, Easington 006D
5	1	195	137.55	Gateshead 008C, Newcastle upon Tyne 026C, Newcastle upon Tyne 029C, South Tyneside 007A, South Tyneside 007B, Sunderland 013B, Sunderland 005E, Middlesbrough 006C, Middlesbrough 003F, Middlesbrough 001B, Middlesbrough 001E, Darlington 008A, Darlington 013B, Wansbeck 003B	**South Tyneside 014A, South Tyneside 015F, South Tyneside 002E**, **Sunderland 021A, Blyth Valley 004B**
6	1	19	174.74	Hartlepool 002F	**Newcastle upon Tyne 025D, Newcastle upon Tyne 030C, North Tyneside 023D**

RTC results at LSOA level (not good health)

Grp	P	*N*	SMR Mean	Std.Res > +1.96	Std.Res < -1.96
1	0	434	65.57	Redcar and Cleveland 010B, Stockton-on-Tees 006D, Derwentside 003E	Castle Morpeth 005B
2	0	372	88.45	Gateshead 019A, Sunderland 035E, Derwentside 007F, Durham 012A, Durham 009C, Easington 009C, Easington 011E, Easington 005A, Easington 005C, Easington 007A, Easington 008B, Easington 013C, Sedgefield 002E	Newcastle upon Tyne 013A, Newcastle upon Tyne 017C, Hartlepool 004D, Middlesbrough 019C, Darlington 001A, Durham 007B, Durham 001A, Durham 007C, Alnwick 001D, Castle Morpeth 003A, Castle Morpeth 007E, Tynedale 006B, Tynedale 004B, Wansbeck 008D
3	0.04	339	111.34	North Tyneside 030C, Sunderland 016E, Derwentside 005C, Easington 011D, Easington 003D, Easington 006B, Easington 007B, Easington 007D, Easington 009F, Easington 012A, Easington 012B, Easington 012C, Easington 012D, Easington 013B	Newcastle upon Tyne 017A, Newcastle upon Tyne 013D, Newcastle upon Tyne 013E, Newcastle upon Tyne 017E, North Tyneside 006A, South Tyneside 003C, Middlesbrough 009D, Darlington 009A, Darlington 008D, Durham 007A, Alnwick 002A, Berwick-upon-Tweed 001B, Berwick-upon-Tweed 001F
4	0.62	342	128.05	Sunderland 030D, Durham 004C, Easington 009B, Easington 011A, Easington 006A, Easington 005B, Easington 006D, Easington 007C, Easington 008A, Easington 006F, Easington 008C, Easington 010C	Newcastle upon Tyne 024A, Stockton-on-Tees 009C, Stockton-on-Tees 010C, Stockton-on-Tees 019B, Berwick-upon-Tweed 001C, Berwick-upon-Tweed 001E, Tynedale 004F, Wansbeck 007D
5	1	169	146.79	Gateshead 006D, Sunderland 016A, Middlesbrough 001C, Redcar and Cleveland 009B, Easington 006E	**Newcastle upon Tyne 023C**

Appendix 10: Colliery workings

NRO 4556/2 “Plan of workings in Broomhill Colliery Queen Seam”

[Chevington Drift]

		NGH	LLTI	DEATHS	Social Fragmentation	Settlement Type	Crime	Living Environment	Domestic Gardens	Green Space	Water
NGH	Pearson Correlation	1.000	.987	.915	.227	-.423	.504	.302	-.140	-.347	-.086
	Sig. (2-tailed)		.000	.000	.000	.000	.000	.000	.004	.000	.052
LLTI	Pearson Correlation	.987	1.000	.884	.139	-.343	.449	.244	-.144	-.297	-.049
	Sig. (2-tailed)	.000		.000	.005	.000	.000	.000	.003	.000	.179
DEATHS	Pearson Correlation	.915	.884	1.000	.318	-.496	.552	.321	-.162	-.400	-.122
	Sig. (2-tailed)	.000	.000		.000	.000	.000	.000	.001	.000	.011
Social Fragmentation	Pearson Correlation	.227	.139	.318	1.000	-.401	.364	.264	-.243	-.281	-.140
	Sig. (2-tailed)	.000	.005	.000		.000	.000	.000	.000	.000	.004
Settlement Type	Pearson Correlation	-.423	-.343	-.496	-.401	1.000	-.446	-.308	.010	.692	.312
	Sig. (2-tailed)	.000	.000	.000	.000		.000	.000	.424	.000	.000
Crime	Pearson Correlation	.504	.449	.552	.364	-.446	1.000	.767	.145	-.326	-.126
	Sig. (2-tailed)	.000	.000	.000	.000	.000		.000	.003	.000	.009
Living Environment	Pearson Correlation	.302	.244	.321	.264	-.308	.767	1.000	.443	-.112	-.056
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000		.000	.018	.145
Domestic Gardens	Pearson Correlation	-.140	-.144	-.162	-.243	.010	.145	.443	1.000	.252	.143
	Sig. (2-tailed)	.004	.003	.001	.000	.424	.003	.000		.000	.004
Green space	Pearson Correlation	-.347	-.297	-.400	-.281	.692	-.326	-.112	.252	1.000	.483
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.018	.000		.000
Water	Pearson Correlation	-.086	-.049	-.122	-.140	.312	-.126	-.056	.143	.483	1.000
	Sig. (2-tailed)	.105	.358	.022	.077	.000	.000	.000	.007	.000	

Appendix 11

LAD Correlation Matrix

		NGH	LLTI	DEATHS	Social Fragmentation	Settlement Type	Crime	Living Environment	Domestic Gardens	Green Space	Water
NGH	Pearson Correlation	1.000	.979	.807	.327	-.390	.492	.396	-.240	-.286	-.038
	Sig. (2-tailed)		.000	.000	.003	.000	.000	.000	.000	.000	.000
LLTI	Pearson Correlation	.979	1.000	.778	.265	-.362	.442	.339	-.240	-.264	-.028
	Sig. (2-tailed)	.000		.000	.050	.000	.000	.000	.000	.000	.006
DEATHS	Pearson Correlation	.807	.778	1.000	.456	-.388	.473	.354	-.277	-.291	-.050
	Sig. (2-tailed)	.000	.000		.000	.000	.000	.000	.000	.000	.000
Social Fragmentation	Pearson Correlation	.327	.265	.456	1.000	-.286	.371	.329	-.329	-.196	-.055
	Sig. (2-tailed)	.003	.050	.000		.000	.000	.000	.000	.000	.000
Settlement Type	Pearson Correlation	-.390	-.362	-.388	-.286	1.000	-.203	-.265	.119	.672	.146
	Sig. (2-tailed)	.000	.000	.000	.000		.000	.000	.092	.000	.000
Crime	Pearson Correlation	.492	.442	.473	-.371	-.203	1.000	.777	-.042	-.176	-.065
	Sig. (2-tailed)	.000	.000	.000	.000	.000		.000	.000	.000	.000
Living Environment	Pearson Correlation	.396	.339	.354	.329	-.265	.777	1.000	.218	-.169	-.031
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000		.000	.000	.003
Domestic Gardens	Pearson Correlation	-.240	-.240	-.277	-.329	.119	-.042	.218	1.000	.214	.086
	Sig. (2-tailed)	.000	.000	.000	.000	.092	.000	.000		.000	.000
Green Space	Pearson Correlation	-.286	-.264	-.291	-.196	.672	-.176	-.169	.214	1.000	.204
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000		.000
Water	Pearson Correlation	-.038	-.028	-.050	-.055	.146	-.065	-.031	.086	.204	1.000
	Sig. (2-tailed)	.000	.006	.000	.000	.000	.000	.003	.000	.000	

CASWARD Correlation Matrix

		NGH	LLTI	DEATHS	Settlement Type	Crime	Living Environment	Domestic Gardens	Green Space	Water
NGH	Pearson Correlation	1.000	.965	.667	-.162	.549	.180	-.470	-.166	-.115
	Sig. (2-tailed)		.000	.000	.000	.000	.000	.000	.000	.000
LLTI	Pearson Correlation	.965	1.000	.639	-.155	.539	.156	-.444	-.155	-.102
	Sig. (2-tailed)	.000		.000	.000	.000	.000	.000	.000	.000
DEATHS	Pearson Correlation	.667	.639	1.000	-.174	.524	.292	-.421	-.127	-.084
	Sig. (2-tailed)	.000	.000		.000	.000	.000	.000	.000	.000
Settlement Type	Pearson Correlation	-.162	-.155	-.174	1.000	-.437	-.056	.531	.441	.325
	Sig. (2-tailed)	.000	.000	.000		.000	.011	.000	.000	.000
Crime	Pearson Correlation	.549	.539	.524	-.437	1.000	.389	-.532	-.297	-.226
	Sig. (2-tailed)	.000	.000	.000	.000		.000	.000	.000	.000
Living Environment	Pearson Correlation	.180	.156	.292	-.056	.389	1.000	-.313	.115	.096
	Sig. (2-tailed)	.000	.000	.000	.011	.000		.000	.000	.000
Domestic Gardens	Pearson Correlation	-.470	-.444	-.421	.531	-.532	-.313	1.000	.455	.319
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000		.000	.000
Green Space	Pearson Correlation	-.166	-.155	-.127	.441	-.297	.115	.455	1.000	.746
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000		.000
Water	Pearson Correlation	-.115	-.102	-.084	.325	-.226	.096	.319	.746	1.000
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000	

LSOA Correlation Matrix

Appendix 12: Further logistic regression analyses including London interaction effects

Table 1: Logistic Regression including London and other predictor variables (Resilience in not good health, *N*=1101)

Predictor variables	B	Sig.	Exp(B)	95% C.I.	
				Lower	Upper
Social Fragmentation	1.476	.000*	4.375	3.047	6.284
Domestic Gardens	.041	.885	1.042	.596	1.821
Green Space	-.877	.305	.416	.078	2.219
Water	-.057	.847	.945	.531	1.681
Crime	-.870	.002*	.419	.244	.719
Living Environment Deprivation	.532	.130	1.702	.855	3.388
London	2.033	.000*	7.637	3.625	16.093
Constant	-4.915	.000	.007		

*statistically significant to a 95% level

Table 2: Interaction Effects Logistic Regression (Resilience in not good health, *N*=1101)

Interaction terms	B	Sig.	Exp(B)	95% C.I.	
				Lower	Upper
London x Social Fragmentation	1.708	.000*	5.517	2.293	13.275
London x Crime	.081	.864	1.084	.430	2.735
Constant	-4.313	.000	.013		

*statistically significant to a 95% level

Table 3: Logistic Regression including London and other predictor variables (Resilience in limiting long-term illness, *N*=1101)

Predictor variables	B	Sig.	Exp(B)	95% C.I.	
				Lower	Upper
Social Fragmentation	2.142	.000*	8.517	5.262	13.784
Domestic Gardens	.356	.154	1.428	.875	2.329
Green Space	.656	.001*	1.927	1.289	2.881
Water	-.040	.859	.961	.617	1.496
Crime	-1.204	.000*	.300	.157	.574
Living Environment Deprivation	.523	.261	1.688	.677	4.207
London	3.372	.000*	29.145	10.842	78.347
Constant	-5.957	.000	.003		

*statistically significant to a 95% level

Table 4: Interaction Effects Logistic Regression (Resilience in limiting long-term illness, *N*=1101)

Interaction terms	B	Sig.	Exp(B)	95% C.I.	
				Lower	Upper
London x Social Fragmentation	1.952	.000*	7.040	2.396	20.679
London x Crime	-.731	.167	.481	.171	1.356
London x Green Space	-.420	.828	.657	.015	29.237
Constant	-4.799	.000	.008		

*statistically significant to a 95% level

Table 5: Logistic Regression including London and other predictor variables (Resilience in premature deaths, *N*=1101)

Predictor variables	B	Sig.	Exp(B)	95% C.I.	
				Lower	Upper
Social Fragmentation	.899	.000*	2.458	1.738	3.475
Domestic Gardens	.043	.873	1.044	.614	1.776
Green Space	.433	.005*	1.541	1.143	2.078
Water	-.447	.460	.640	.195	2.094
Crime	-.699	.023*	.497	.273	.907
Living Environment Deprivation	.274	.511	1.316	.580	2.984
London	2.181	.000*	8.857	4.069	19.279
Constant	-4.443	.000	.012		

*statistically significant to a 95% level

Table 6: Interaction Effects Logistic Regression (Resilience in premature deaths, *N*=1101)

Interaction terms	B	Sig.	Exp(B)	95% C.I.	
				Lower	Upper
London x Social Fragmentation	1.581	.000*	4.859	2.065	11.431
London x Crime	-1.251	.009*	.286	.112	.731
London x Green Space	.000	.507	1.000	.998	1.001
Constant	-4.194	.000	.015		

*statistically significant to a 95% level

Appendix 13: Quality Outcomes Framework (QOF)

How are the QOF points calculated?

The QOF is a component of the new GP contract, introduced in 2004. Achievement is measured for indicators in four areas, known as 'domains':

- clinical indicators, covering the major chronic diseases such as asthma, cancer, coronary heart disease and diabetes – surgeries can achieve up to 697 QOF points
- organisational indicators, covering how well surgeries record information about patients, patient communications, education and training, practice management and medicine management – surgeries can achieve up to 167.5 QOF points.
- patient experience indicators, covering how well surgeries manage patient surveys and consultation length – surgeries can achieve up to 91.5 QOF points.
- additional services indicators, for surgeries that provide cervical screening, child health surveillance, maternity services, and contraceptive services – surgeries can achieve up to 44 QOF points

What results can I show for the listed practices?

By checking the options in the display panel you can compare:

- practice result against local PCT (Primary Care Trust) Average scores
- practice result against England Average score
- clinical achievement results for your practice against local PCT Average results
- clinical achievement results for your practice against England Average results

Source: http://www.qof.ic.nhs.uk/understanding_the_results/

[Last accessed: 25/09/2012]

Appendix 14: 2010-2011 QOF Results

TOTAL ACHIEVEMENT:

Percentage of total achievement points	10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
Total Achieved Results	95.5% 954.54 out of 1,000.0 points: 0.8 percentage points below PCT Average, 0.8 above England Average

DOMAIN TOTALS:

Percentage of total domain points	10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
Clinical Results	96.9% 675.26 out of 697.0 points: 1.1 percentage points below PCT Average, 0.1 above England Average
Organisational Results	98.2% 164.50 out of 167.5 points: same as PCT Average, 0.8 above England Average
Patient Experience Results	77.4% 70.78 out of 91.5 points: 1.5 percentage points below PCT Average, 4.8 above England Average
Additional Services Results	100.0% All the 44.0 points: 1.9 percentage points above PCT Average, 2.9 above England Average

CLINICAL DOMAIN INDICATOR GROUPS:

Percentage of total	10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
Asthma	100.0%

4 indicators	All the 45 points: 0.7 percentage points above PCT Average, 1.3 above England Average
Atrial Fibrillation 3 indicators	100.0% All the 27 points: 0.1 percentage points above PCT Average, 1.4 above England Average
Cancer 2 indicators	100.0% All the 11 points: 2.3 percentage points above PCT Average, 3.1 above England Average
Cardiovascular Disease Primary Prevention 2 indicators	100.0% All the 13 points: 5.2 percentage points above PCT Average, 6.3 above England Average
Chronic Kidney Disease 5 indicators	98.8% 37.56 out of 38 points: 0.8 percentage points above PCT Average, 2.4 above England Average
Chronic Obstructive Pulmonary Disease 5 indicators	100.0% All the 30 points: 1.7 percentage points above PCT Average, 2.6 above England Average
Coronary Heart Disease 10 indicators	100.0% All the 87 points: 0.2 percentage points above PCT Average, 0.9 above England Average
Dementia 2 indicators	100.0% All the 20 points: same as PCT Average, 1.9 above England Average
Depression 3 indicators	84.9% 45.00 out of 53 points: 3.5 percentage points below PCT Average, 0.2 below England Average
Diabetes Mellitus (Diabetes) 17 indicators	86.7% 86.74 out of 100 points: 10.2 percentage points below PCT Average, 9.4 below England Average

Epilepsy 4 indicators	100.0%	All the 15 points: 2.7 percentage points above PCT Average, 5 above England Average
Heart Failure 4 indicators	100.0%	All the 29 points: same as PCT Average, 2 above England Average
Hypertension 3 indicators	100.0%	All the 81 points: 0.5 percentage points above PCT Average, 0.9 above England Average
Hypothyroidism 2 indicators	100.0%	All the 7 points: same as PCT Average, 0.3 above England Average
Learning Disabilities 1 indicator	100.0%	All the 4 points: 2.2 percentage points above PCT Average, 0.8 above England Average
Mental Health 6 indicators	99.9%	38.96 out of 39 points: 1.8 percentage points above PCT Average, 4.7 above England Average
Obesity 1 indicator	100.0%	All the 8 points: same as PCT Average, same as England Average
Palliative Care 2 indicators	100.0%	All the 6 points: 4.3 percentage points above PCT Average, 8.6 above England Average
Smoking 2 indicators	100.0%	All the 60 points: 0.6 percentage points above PCT Average, 0.8 above England Average
Stroke or Transient Ischaemic Attacks (TIA) 8 indicators	100.0%	All the 24 points: 0.1 percentage points above PCT Average, 1.4 above England Average

ORGANISATIONAL DOMAIN INDICATOR GROUPS:

Percentage of total	10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
Education and Training 7 indicators	100.0% All the 28 points: 2.6 percentage points above PCT Average, 3.1 above England Average
Medicines Management 8 indicators	100.0% All the 36 points: 0.2 percentage points above PCT Average, 1.8 above England Average
Patient Communication 2 indicators	100.0% All the 3 points: same as PCT Average, 0.8 above England Average
Practice Management 7 indicators	77.8% 10.50 out of 13.5 points: 20.7 percentage points below PCT Average, 20.8 below England Average
Records and Information about Patients 12 indicators	100.0% All the 87 points: 2.2 percentage points above PCT Average, 3.1 above England Average

PATIENT EXPERIENCE DOMAIN INDICATOR GROUPS:

Percentage of total	10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
Length of Consultations 1 indicator	100.0% All the 33 points: same as PCT Average, 1.2 above England Average
Patient Survey 2 indicators	64.6% 37.78 out of 58.5 points: 2.5 percentage points below PCT Average, 6.8 above England Average

ADDITIONAL SERVICES DOMAIN INDICATOR GROUPS:

Percentage of total	10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
Cervical Screening 4 indicators	100.0% All the 22 points: 0.5 percentage points above PCT Average, 2 above England Average
Child Health Surveillance 1 indicator	100.0% All the 6 points: 2.2 percentage points above PCT Average, 3.4 above England Average
Contraceptive Services 3 indicators	100.0% All the 10 points: 5.8 percentage points above PCT Average, 5.6 above England Average
Maternity Services 1 indicator	100.0% All the 6 points: same as PCT Average, 0.8 above England Average

Appendix 15: Publications arising from this research

Published

Cairns, J.M., Curtis, S.E. and Bambra, C. (2012) Defying deprivation: a cross-sectional analysis of area level health resilience in England. *Health & Place*, 18, 928-933.

Cairns-Nagi, J.M. and Bambra, C. (2012) Defying the odds: a mixed-methods study of health resilience in England. *Social Science & Medicine*, 91, 229-237.

In preparation

Cairns-Nagi, J.M. Bonding, bridging and division: a call for a third dimension of social capital and its multi-dimensional impact on health. *Progress in Human Geography*.

Cairns-Nagi, J.M. *The role of local government in promoting and sustaining 'health resilience' in economically deprived areas*. Occasional Paper, NEPHO.